

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

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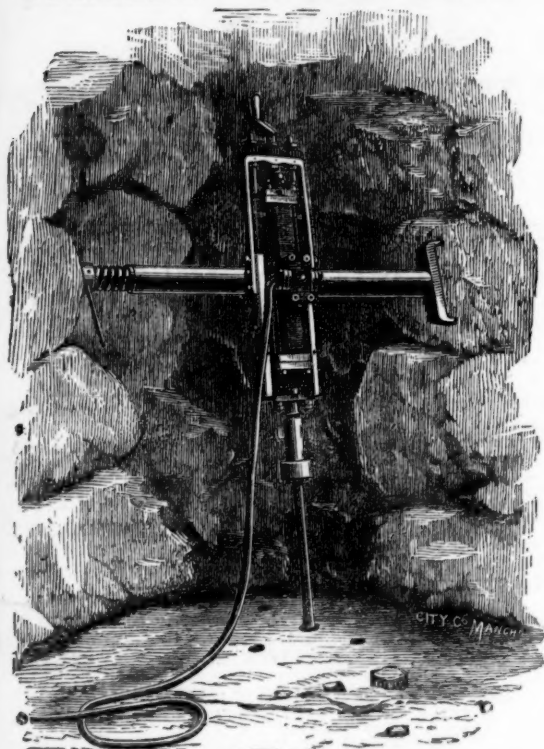
No. 2515.—Vol. LIII.

LONDON, SATURDAY, NOVEMBER 3, 1883.

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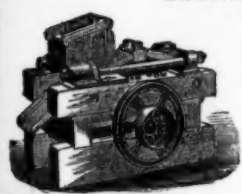


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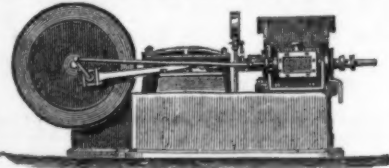
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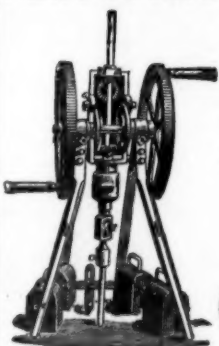
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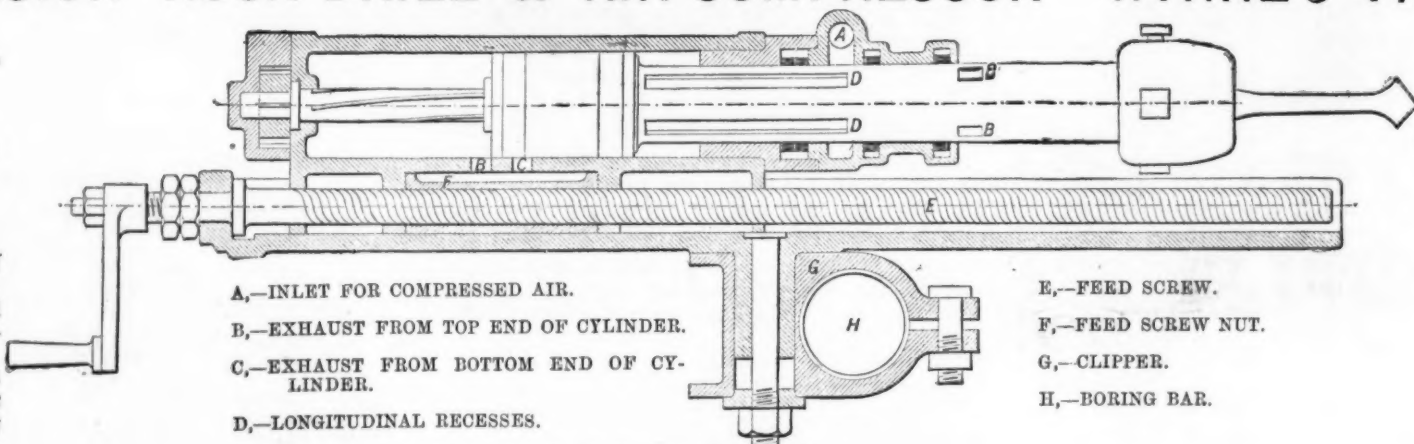
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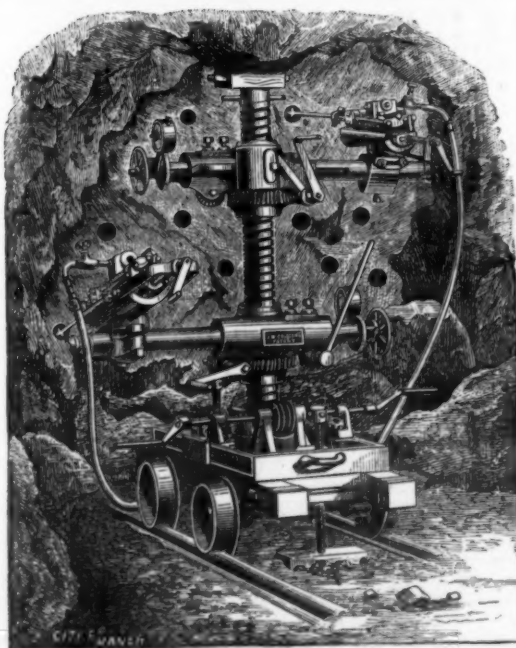
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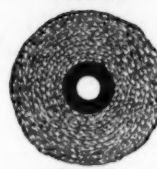
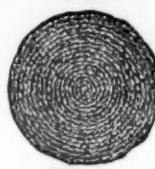
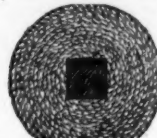
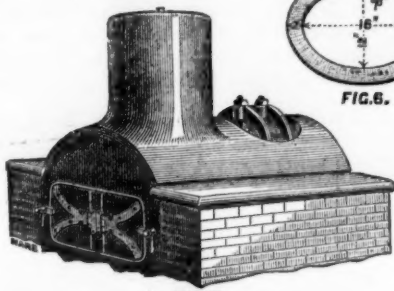
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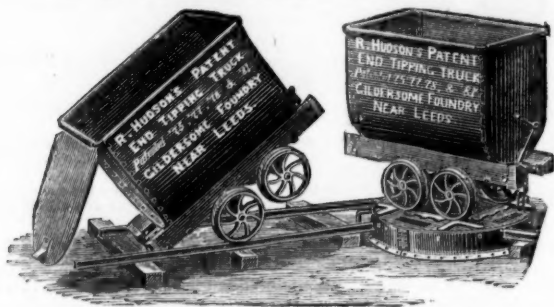
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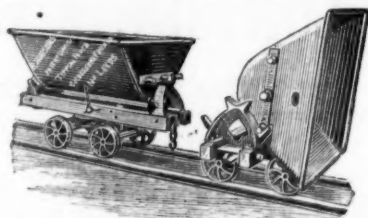
1.—PATENT STEEL END TIP WAGONS.



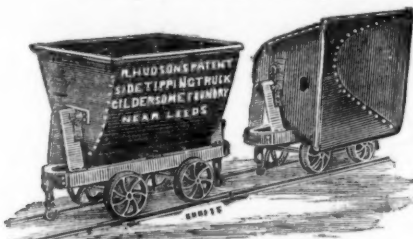
7.—PATENT STEEL MINING WAGONS.



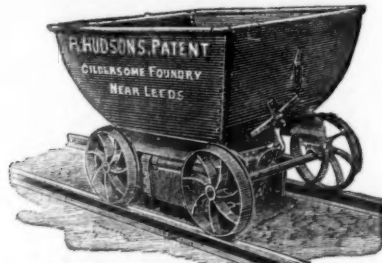
2.—PATENT UNIVERSAL TRIPLE-CENTRE STEEL TIPPING TRUCK,
Will tip either SIDE or either END of rails.



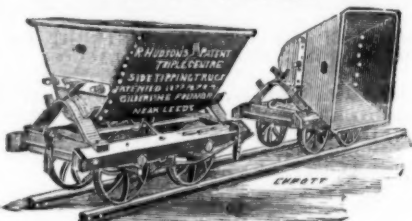
8.—PATENT DOUBLE-CENTRE STEEL SIDE TIP WAGONS,
Will tip either side of Wagons.



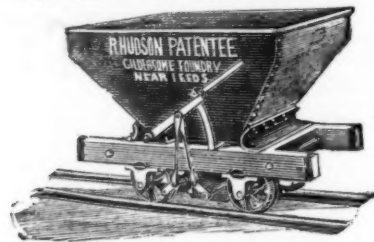
12.—PATENT STEEL HOPPER WAGON,
WITH BOTTOM DOORS.



3.—PATENT TRIPLE-CENTRE STEEL SIDE TIP WAGONS.



13.—PATENT STEEL HOPPER WAGON.



4.—PATENT STEEL PLATFORM WAGON.



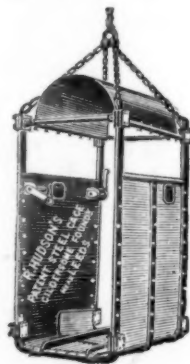
9.—PATENT STEEL ALL-ROUND TIP WAGON.



14.—SELF-RIGHTING STEEL TIP BUCKET.
(The "CATCH" can also be made SELF-ACTING if desired.)



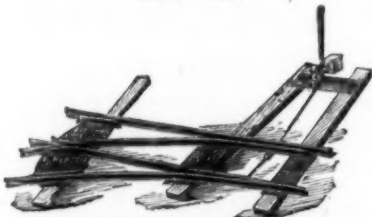
15.—STEEL CAGE.



5.—PATENT STEEL CASK.
(As supplied to H.M. War Office for the late war in Egypt).
DOUBLE the STRENGTH of ordinary Casks without any INCREASE in weight.
(Made from 10 gals. capacity UPWARDS to any desired size.)



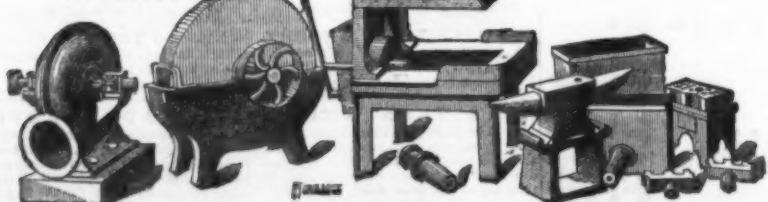
10.—LEFT-HAND STEEL POINT AND CROSSING.



11.—RIGHT AND LEFT-HAND STEEL POINT AND CROSSING.



6.—ROBERT HUDSON'S
PATENT IMPROVED IRON SMITH'S HEARTH.
NO BRICKWORK REQUIRED.
A Special quality made almost entirely in STEEL, effecting a GREAT SAVING IN WEIGHT.



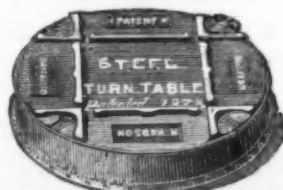
Large numbers in use by all the principal Engineers in this country and abroad.

16.—PATENT STEEL WHEELBARROWS.
Made to any Size.
Lightest and Strongest in the Market.



A great success.

17.—STEEL SELF-CONTAINED TURNTABLE.



(Also made in CAST IRON for use where weight is not a consideration.)

18.—"AERIAL" STEEL WINDING TUB.



Largely employed in the South African Diamond Fields.

ALL KINDS OF BOLTS, NUTS, AND RIVETS MADE TO ORDER ON THE PREMISES.

Original Correspondence.

COLORADO SILVER MINES—ENGLISH INVESTMENTS IN THE SAN JUAN AND ADJACENT DISTRICTS.
VALUABLE DISCOVERY IN THE OLATHE DISTRICT.

SIR,—Since the advent of the Denver and Rio Grande Railway into the famous mining districts of the San Juan, a great number of mines which had been lying idle, or only partially worked for some years past, have been developed to a greater extent than ever before, and during the present year they have contributed very materially to the increasing product of the State. The facilities offered by the railway, since the extension to Silverton of the Southern branch and the completion of the Western extension to Salt Lake, passing within 35 miles of the famous mines of Ouray and Red Mountain, have been of great benefit to the miners of those localities. A great deal of work has already been done to prospect this part of the State, and which has resulted in the discovery of several valuable mines, prominent among them being the National Belle and Yankee Girl, both having acquired a national reputation, owing to the immense bodies of rich ore which have already been opened up, although it is less than a year since these mines were first discovered.

Several other important discoveries have been made in the Red Mountain district, and, as the product is mostly shipped to the smelters of Pueblo and Denver, it greatly increases the receipts of the railway, and makes mining a profitable investment to those engaged in the work. The older mining camps of this locality have been worked more systematically during the past summer than heretofore, particularly those in and around Telluride. The Cimarron, Smuggler, Union, and others are making daily shipments of high-grade ore to Denver, which average \$250 per ton, after deducting transportation and smelting charges. A great deal of the mineral taken from these mines, however, does not exceed 50 ozs. per ton; but, by concentrating the same, and reducing 5 tons to 1, the concentrates become almost as valuable as a ton of high-grade ore.

In another year, when the Denver and Rio Grande Railway is extended from Montrose to Ouray, a distance of 35 miles, the rich mines of the San Juan will contribute more to the output of the State—Leadville excepted—than all the other mining districts combined, and with a greater assurance of continuance for many years to come. During the past year considerable English capital has been invested in the various mines of the San Juan, and more recently a very important sale has been made to an English corporation, known as the Ouray Consolidated Mining Company, of the Allied Mines, situated in Ouray County, five miles from the projected terminus of the railway, and in one of the richest mining districts of the State. From what I know of these mines I have every reason to think that the company have been fortunate in securing a valuable group of mines, the title of which is fully protected by United States Government patent. A great deal of development has been done in these mines, disclosing large bodies of good paying mineral, which, according to the Official Returns, show an average of 60 ozs. in silver, with a large percentage of lead, yielding a return of nearly \$100 per ton. The company are in possession of every appliance for the economical working of their various mines. By the aid of the Hallidie Cable Tramway the ore is carried from the mouth of each tunnel directly to the concentrating mill in the valley below, where, at a nominal expense, several tons are reduced to one, thereby saving a considerable sum in transporting the product to the smelters of Denver and Pueblo. With proper management, conducted in a scientific manner, the Allied Mines should prove a good investment, and would, I think, soon join the many other dividend-paying mines of Colorado. The Cincinnati, a very promising gold mine, located a short distance beyond the Allied Mines, must also be included among the purchases recently made by English investors, and although of less magnitude than those just mentioned, it is nevertheless likely to develop into a rich mine. The lessees of the Olathe Silver Mining Company, working that portion of the company's property in Leadville, lying between the Annie and Little Pittsburg, on Fryer Hill, recently discovered a rich body of ore, averaging nearly 400 ozs. in silver, which pays the company a royalty of more than \$100 per ton. The following mines of Leadville—Iron Silver, Annie, Dunkin, and Evening Star—paid dividends during September amounting in the aggregate to \$200,000, leaving a very substantial surplus in the treasury of each company.—*Denver, Colorado, Oct. 15.* J. FITZ-BRIND.

MINING IN MEXICO.

SIR,—It is stated in the Two Republics of Sept. 30, just received, that the Real del Monte property has been offered to the Americans for \$6,000,000, with the option of accepting it within three months from Sept. 1, and that if they do not accept it an English Syndicate may do so, and pay cash for the property. Surely there must be some error in the amount stated, for unless the figures were considerably lower it is hardly likely that an English company could be floated in this country for working the mine, seeing that the United Mexican Company, which has made a clear return since January last of \$104,750, and for the week ending Sept. 22 of 1000.—with a tunnel more than a mile and a-half long, and 624 ft. under the mountains—does not induce the public to give more than the present price of shares, it seems to me that there is very little probability of a Real del Monte Company being taken up here on the terms mentioned. *Oct. 28.* RIVAL.

MINING NOTES—MEXICO.

SIR,—Rich as Mexico is in many parts in natural products, its mineral is more important, and not unreasonably does it hold a high place as a producer of the precious metals. From 1760 to 1769 the amount of silver registered was \$112,828,860, and from 1796 to 1810 the amount was \$342,114,285, the unregistered silver for the same period being computed at \$1,190,000. Humboldt reckoned in 1803 that Mexico had yielded up to that time \$1,767,952,000 worth of silver; the unregistered silver being taken into account, it is estimated at \$2,027,952,000; but even this is considered too low, as the registered coin for 136 years is \$1,708,173,436, whereas the production has been going on for more than twice that length of time. On referring to the new volume of Encyclopædia Britannica, just out, the actual returns of the precious metals are thus given:—1537 to 1890, 24,000,000 gold, 698,000,000 silver; total, 622,000,000. The English companies established in and about 1824 gave considerable impetus to Mexican mining. The amount of capital introduced by these companies was about the same as that which during the past few years has been put in Indian gold mines—from 4,000,000 to 5,000,000. Able miners and the best machinery of the time were sent over, and the improved methods have done much in developing the resources, aided by Germans and Americans. The unhappy events of 16 years ago retarded progress in mining, and as far as English capitalists are concerned very little has since been done. After the panic and collapse of the Real del Monte Company British capitalists have unwisely kept too much aloof.

The improved prospects of the United Mexican Company are doing much to encourage renewed enterprise. Few mining companies have continued their operations with the same persistency as this company, and it is hoped and fully believed in certain quarters that great success will yet be achieved. The works have been carried on after a primitive fashion, but now that success is dawning the company may put forward the best means and appliances at command. The vein on which this company is at work is the richest and largest known in Mexico. In places it is 150 ft. wide, and extends for a distance of eight miles. The principal mines were on this vein, and have made enormous yields. The difficulty of access to many of the mining districts is not and cannot be well understood, the roads often being of the most wretched character; but railway enterprise is dispersing troubles of this nature, and cannot fail to bestow great benefits on the mining industry. The principal mining States are Guanajuato, Zacatecas, Guadalupe, San Luis, Potosi, Oaxaca, Valladolid, Sonora, Durango, and Chihuahua. A large amount of silver at one time was produced on the Pacific slopes, but many of the mines are closed and the works overgrown with vegetation. Some very remarkable specimens of native silver have at times been

discovered—the silver balls of Sonora, perhaps, being the most wonderful, the weight of the whole being 4033 lbs.—one mass of pure silver weighing 2700 lbs. The following list shows the enormous wealth of some of the mines:—

Valenciana from 1788 to 1810 produced annually \$1,446,067.
Catorce from 1810 to 1824 \$2,854,000 annually.
Real del Monte \$600,000 annually.
Santa Eulalia in 86 years produced \$100,000,000. The metalliferous dust of the Zaral Mine produced in two years \$4,000,000.
Veta Grande from 1827 to 1839 produced \$130,000,000.
Fresnillo produced \$2,500,000 annually.

So rich are some of the ores that it is on record that the Marquis Rayas sold some of the ores from Santa Anita for their weight in silver, because of the gold which it contained. Had the same enthusiasm for Mexican mining been shown by English capitalists that they have shown for mining in other parts of the world, the results to the British investor would have been almost incalculable. Humboldt said at the beginning of this century that there was enough silver in Mexico to deluge the world. GABBOTT AND CO.

TREATMENT OF GOLD AND SILVER ORES.

SIR,—The *Mining Journal* of Sept. 8 contained a lengthy article under the head of "Treatment of Gold and Silver Ores," giving a detailed description of an improved process for treating such ores, patented by the Campbell Mining and Reduction Company of New York. Though no endorsement is made of the process, the prominence given the article in a journal recognised as the exponent of the mining interests of the whole country, involves the presumption that the process referred to would at least have some degree of merit. For your own information, as well as that of your numerous readers, permit me to say that the so-called Campbell process is of the most doubtful character. Works were put up in this city some 18 months ago with a view of demonstrating the success of the process, and run for a few days at a time on odd lots of ore, with a pretence of getting better results than were obtained by any other method, but no evidence was ever submitted that would convince any intelligent mining man as to the reality of the claims made. After running in this way for about 12 months it became apparent to all that the works were better calculated to subserve a stock operation than for practical use. Having failed in this endeavour an incurred heavy indebtedness which they could not meet, the work were put into bankruptcy a few months ago by the creditors, with a small prospect of realising much in the way of dividends. Works put up in New York, evidently for the same purpose, I am credibly informed, have been run much in the same way and with the same result. It is by such operations as these that mining, one of the most honourable and legitimate industries of the country, is brought into disrepute and investors involved in heavy losses. Y. T. X.
San Francisco, Oct. 12.

THE TREVITHICK MEMORIAL.

SIR,—A letter from Mr. Macfie demands some explanation. In the first place it may be observed that the statement that the Trevithick memorial shows signs of revival is founded on some misconception. The Trevithick memorial, so far as my original proposal in the *Mining Journal* was concerned, has been accomplished. By the contributions of the committee a sum sufficient for a statue, or at least a bust of Trevithick in Westminster Abbey alongside of Watt and Stephenson has been secured. The committee have, however, gone beyond this idea of a personal tribute to Trevithick or his native county, and in a wider and liberal spirit propose to found scholarships in his name, which may be encouragement for exertion to young men of his own class, not in Cornwall only, but throughout England, Ireland, and Scotland, wherever the benefits of Trevithick's inventions are engaged. If the colonies and India give contributions, as is expected, then their claims will be also regarded.

It is gratifying to find that Mr. Macfie acknowledges Trevithick as an eminent Cornishman. There is no one who knows anything really of Wm. Murdoch who will not be willing to acknowledge also his title to the grateful commemoration of his countrymen. If it were on account of gas alone Murdoch is justly entitled to this. My friend, Mr. Macfie, is however hardly content to celebrate Murdoch, but he wishes to limit the tribute of gratitude at length offered to Trevithick. On suppositious grounds he makes Murdoch the inventor of the locomotive, and sets Trevithick aside. He seems to consider that the mathematical instrument maker from Glasgow and some few of his fellow countrymen descended from the North and created a school of engineering among the savages in Cornwall. In fact, his whole conceptions of the state of affairs are in utter disregard of the real conditions. To the contemporaries of Watt, Trevithick, and Murdoch, and to those who like myself associated with those contemporaries, and knew those conditions, who knew their friendships and their hates, who read their correspondence, and were able to appreciate the men and their deeds, Mr. Macfie's conclusions do not commend themselves. Murdoch wants no such advocacy, but then without entering into any controversy or assertions it is sufficient to say that if Mr. Macfie were right the ultimate conclusion of his assertions would be fatal to the claims of Murdoch himself, because he says that Murdoch made a locomotive before Trevithick. Murdoch becomes the inventor of the locomotive, and Trevithick is not the inventor of the locomotive. Mr. Macfie has not taken into account that gas-lighting was known 100 years before Murdoch. Those who are conversant with the history know that gas-lighting and the steam locomotive date before Murdoch and Trevithick, and therefore those who know do not deny this. In the Conservatoire at Paris is still to be seen the locomotive which was made by Cugnot, and shown at Paris. In a book which was seen by Trevithick in our library, and now given to the Institution of Civil Engineers, the "Recueil des Machines," published by the Academy of Sciences, the locomotive, with so many other inventions, is to be found.

It is true that the word invention is loosely used, but in these cases we call the inventor the one who first practically and publicly makes an invention known and available for use, as Murdoch did with gas and Trevithick with the railway and road locomotive. In writing the history of such matters we take into account the various predecessors and award them merit, but we count them rather as projectors in their several degrees—in the public interest it is necessary it should be so. If Murdoch had only dealt with gas and the locomotive at Redruth he would have held this minor place in history. If all that Mr. Macfie says in claiming Trevithick as Murdoch's pupil, imitator, and shadow were correct, it does not touch the question nor invest Murdoch with the title of inventor of the locomotive against Trevithick, to which Murdoch himself made no valid claim. We must bear in mind that Trevithick and Andrew Vivian not only experimented on the locomotive, but engaged in its practical construction. They took out a patent. This was an excellent occasion for Boulton and Watt, who had no love for Cornishmen—their enemies in the patent case—nor for Trevithick in particular, who, Watt said, ought to be hanged for the invention of the high-pressure engine. Boulton and Watt, who watched every patent, should have shown that this one was the previous invention of their foreman, Murdoch, or at least exposed it in the philosophical journals in which the performances of the locomotive were frequently recorded. One part of the claim to the title of inventor is the exhibition of the engine in London, its being set to work on the Merthyr Tydvil Railway, and the manufacture of several engines. In fact, though the claim of Murdoch was put forward as the inventor of gas-lighting, and as such I remember it was maintained by many against Winsor, his claim against Trevithick was left to be invented now.

In going through the history of the locomotive for the history of Trevithick and for the history of George Stephenson, and in that of the steam-engine, for the edition given by me of Arago's Life of Watt, no such case as that raised by Mr. Macfie was presented to me. It has not presented itself to Stuart or Professor Pole, and our contemporaries who have written the history of the steam-engine. It was a Scotchman who assumed the name of Stuart who first recorded in the Anecdotes of the Steam-engine the rights of Trevithick to the locomotive, and it was Professor Pole who maintained his title with regard to the high-pressure engine. The proposed memorial

to Richard Trevithick as the inventor of the locomotive is provided by the contributions of every locomotive engineer and superintendent in England and Scotland, men who are generally conversant with the history of the locomotive, and who are themselves contributors to it by their inventions.

Under these circumstances it is to be hoped Mr. Macfie will persevere in obtaining a commemoration of Murdoch, and that he will leave those similarly engaged for Trevithick to carry out their further and liberal project of founding Trevithick scholarships. If besides a personal tribute to Murdoch, Mr. Macfie were to propose scholarships for gas engineers and those engaged in various branches of illumination, he would render a valuable service to our schools of applied chemistry and physics. HYDE CLARKE.
St. George's Square, S.W., Oct. 27.

IMPROVED SAFETY CAGES.

SIR,—As I have been travelling, it is only to-day that I have received the *Mining Journal* of Oct. 13, with Mr. Niness's letter referring to my first communication. Mr. Niness is evidently displeased by what seems to him undue levity in my first letter. I must plead guilty to an endeavour to introduce a thin vein of humour, my object being to express my meaning more graphically. I yield to no man in full appreciation of the serious nature of the question; but I have yet to learn (among a great many other things) that a serious question may not be discussed cheerfully. Mr. Niness, though admitting himself open to conviction, is decidedly adverse to my idea, but he will allow me to remark that it was unnecessary to prophesy the burning of my fingers, as of course it is not of the slightest consequence whether I (or anyone else) burn my fingers, provided some steps, however small, be made towards the solution of what all admit to be a burning question. My own intention is to discuss this and any other matter with a complete absence of anything that may in any way be objectionably personal.

As to making public the details of my contrivance, I shall again decline to do this at present, as I consider it valuable, and wish beforehand to have it protected. I say this with all deference to Mr. Niness, who, though I have not the pleasure of his acquaintance, I prefer to assume, from the frequency with which his name appears in your columns, to be a gentleman highly qualified to express an opinion on a subject connected with mining. The fact of my having made public the principle on which my contrivance is based will, I believe, rescue me in the opinion of the majority of your readers from the imputation of carrying my reticence to the extreme of jealousy or greed.—*Haarlem, Holland, Oct. 25.* R. M.

COMPETITIVE TRIAL OF PULVERISERS.

SIR,—We are very glad to see in last week's *Mining Journal* that Mr. William Husband, of Hayle, has taken up the case of the Committee of the Mining Institute, as it gives us a chance of putting every particular relating to the recent awards given to pulverisers at Redruth before the mining public. We do not for one moment dispute the statement that we were consenting parties to the rules of the competition, and we have not at any time done so. That Mr. Husband should say that we were allowed a preliminary working of our machine, without mentioning that all the others had worked theirs also, is very unfair. If, as he says, "this was giving him (Mr. Dingley) an advantage over most of the other competitors" then the competition would be carried on on unjust grounds; for would it not be manifestly wrong to give one man an advantage over another, and still call the whole proceeding a competition? We will not, however, assert that such was the case. The committee gave us only the same privilege that had already been taken by the others, and because such privilege happened to be at the committee's expense Mr. Husband has no moral authority whatsoever to infer that this affected in any way the amount of work subsequently done by our machine.

Owing to the inclemency of the weather on the day of the trial of our machine we very naturally demanded an allowance for the delays which occurred. That such allowance was equitable Mr. Husband does not deny. On the contrary, he says that as the committee could not make an exact allowance they decided, because of their inability to make the calculations necessary, that one should be made, and yet in the face of this plain declaration the competition was supposed to be carried out on equitable grounds. About the protecting of the belt which Mr. Husband declares obviously impossible at an hour's notice, and with which we quite agree, we beg to state that Mr. Rich promised faithfully 24 hours before the trial to get done, but he failed to carry out his engagement. We suppose the fear of a good drenching prohibited him from doing so.

The next point to which we are compelled to allude is the supposed advantage we possessed through absorbing all the power of the engine. Now, it is a well-known fact to every engineer that if you work a 5-horse engine to 10-horse power, as we were compelled to do, you do so at a most decided disadvantage. Moreover, however great the allowance to which the small machines might be entitled, they would still be altogether out of the running, so they have nothing to do with the point at issue. We are certainly rather surprised to see Mr. Husband taking up the cudgels after he had distinctly said at Hayle that he should vote for a fresh trial or bracket us with the other machine, and give us each a silver medal. As for blaming Mr. Rich, that gentleman must evidently have been under the same impression as ourselves, or he would not have remarked that it was no use for Mr. Husband to throw the fault on him. Even from the letter with which Mr. Rich has favoured us, and which has appeared in last week's *Journal*, your readers can see that the committee believe we are entitled to some allowance for stoppages; but he carefully adds that such an allowance they consider as counterbalanced by the quantity of rain which was falling on the stuff during the trial. Well, Sir, before the trial of any one of the machines commenced the water was actually running out of the stuff, and when this was the case we should like Mr. Rich to say what more could it hold. Water is not compressible, and a vessel already overflowing is generally supposed to be incapable of holding any more. With reference to Mr. Rich's assertion that stoppages caused an accumulation of steam we are surprised that he should say so, for we thought he knew better. Now, as we were working the boiler at blowing-off pressure, there could be no accumulation of steam, and consequently his statement is, to say the least, slightly incorrect. This he, and the committee, have evidently overlooked. The committee did actually allow one hour on account of stoppages, but they put the coal used in that hour against us, which, as it was not used in pulverising, was, and is still we consider, unfair. We append the following figures for the consideration of your readers:—First machine produced 23-26 lbs. of tin to the ton of stuff; Dingley's machine produced 25-01 lbs. of tin to the ton of stuff; difference 1-75 lbs. of tin to the ton of stuff in favour of Dingley's machine, being 7-52 per cent. on the sample.

If, instead of the 4 cwt. 3 qrs. 19 lbs. of coal placed against us for time of working and stoppages combined, there had been an allowance of only 9 lbs. we should, according even to the committee's showing, have won the silver medal. Now, do they mean to assert that during the hour of stoppages we did not consume 9 lbs. of coal? These figures will speak for themselves. In conclusion, we beg to inform the public that up to the present time no one has seen fit to accept our challenge as to the merits of our machine. This we beg distinctly to state is not what Mr. Husband calls a stake, but a premium we offer for competition. Nobody, therefore, except ourselves has anything to lose, but (if we are defeated) everything to gain.
Truro Foundry, Oct. 29. FRANCIS DINGLEY AND SON.

THE CALLINGTON DISTRICT, AND ITS MINES.

SIR,—It is with pleasure that I can speak of some improvement in some of the mines around us. The Prince of Wales for instance has greatly improved according to the most recent accounts. Langford according to agent's report is looking much better than might have been expected some few weeks since. At New Holmbush there is a decided improvement which anyone can see if they will avail themselves of the opportunity of going on the ore-floors to look at the ore that has been brought to surface. They are opening up a course of ore at different points, and they well deserve it for their perseverance

Trebartha Larnar is looking remarkably well, the Gulley lode particularly; as there is no arsenical munda in this lode they have no difficulty to get it fit for the smelters without burning, and as they are keeping the stamps on day and night from this lode there is nothing to prevent them returning tin when they like, and as there is such an abundant supply of water for all requirements that one item will be worth to the company 2000*l.* per annum—that is equal to a small dividend. Wheel Lusky is looking very promising. I expect to see in the next Journal a good report from the agent of the both last-named mines.

As to Wheel Benny, I would say in reply to "Veritas" that if no one answers his questions in the last Journal this week I will go on the mine next week and answer them. JNO. BUCKINGHAM.
Callington, Oct. 31.

SLATE, AND SLATE QUARRYING.

SIR,—Several persons have undertaken from time to time to write treatises on slate and slate quarrying; but in none of these numerous treatises can the quarry manager or proprietor find any real or material assistance, inasmuch as their substance is more to the want or purpose of those unacquainted in the matter. Consequently a treatise containing or presenting a systematic mode of working, both on the open and underground systems, especially the latter, would certainly be an invaluable boon to all quarry owners, as it would be conducive to enhance slate quarrying generally. Should anyone undertake to supply this great and essential want, there is no doubt that he would be well remunerated for his trouble, as it is a work greatly required.

Allow me at present to make a few errant remarks relative to this matter. The *Mining Journal* teems with information respecting nearly all the known metals of the world, yet a most important and indispensable mineral—slate—hardly ever finds a space at all in its columns. However, I presume that this arises chiefly from the direct negligence and reluctance on the part of those connected with the trade to supply any information connected therewith. The importance of the slate trade can be easily conceived when it is considered that upwards of 500,000 tons are annually produced in North Wales alone, realising fully the handsome amount of 1,500,000*l.* Such a gigantic industry should certainly be treated of by way of an article, &c., now and then in the *Journal* for the general interest of the public as well as that of the parties connected with this important industry. Slate quarrying, it should be borne, is not antediluvian, nor can its antiquity be compared with that of the ancient potteries or pyramids of Egypt, nor with the sunburnt bricks and tiles of the Vale of Shinar at the time of the rearing of the fabled Tower of Babel; neither can it claim any prominent existence many centuries ago, nor vaunt much of its real magnitude outside the present century, therefore it is evident that it has not been subjected to the scrutiny of the bygone ages—this having fallen to the lot of the critics of the present century and those following. Now, however, it has a real existence, being well demonstrated by the tangible proof of its real necessity for the covering of the sweet homes of England as well as those of many a far and foreign country. It is an universal opinion in all ages and countries that the young and feeble need the assistance and care of the better abled, or at least the attention of those to whom they are entrusted. So also slate quarrying, though a century old, may be said to be young and frail, and therefore need some assistance, especially slate quarrying on the underground system. All who have the least intelligence and knowledge of the slate quarries worked on this system are certainly well aware of the maladministration and monstrous modes of working that exist in those subterranean works. And although these works are wrought in darkness, yet I presume it is but fair that such erroneous modes should be brought to light so as to put persons and parties connected therewith on their guard, in order to avoid the annihilation of their valuable properties, and that evidently through want of knowledge and a regular system of working. Therefore the theories by which many of the underground quarries are generally worked are certainly most prejudicial both to the proprietors and workmen as well as the quarry itself. Many a promising quarry has thus been brought to an endless stand owing to the futility of its mode of development. Having been connected with slate quarries for upwards of 25 years, I know of several instances that have fallen under my notice where sums of 20,000*l.* and 100,000*l.*, &c., have been laid out in quarry operations, the greater part of which has been thrown away, and the undertaking in consequence thereof condemned as worthless on that very account. Those that are speculating and carrying on the business should be alive to this important fact, as the loss of capital in this particular way is far beyond the conception of anyone interested in slate quarrying. And should the inevitable consequences of erroneous modes of working be revealed to them it would certainly throw them into the utmost consternation. It is a well-known fact that all shipowners to the best of their knowledge select the most practical mariners for their captains to command their valuable ships. So men that have been first ordinary mariners, then mates, and afterwards captains, always make the most efficient captains, as these experiences combined in them, together with the proof of a sound knowledge of navigation, make them competent for such avocations. And should any one assume for such a capacity, and be deficient in any such qualifications, the person who would engage him for such an important charge would be considered by all a very great simpleton, as he would thus be subjecting his property, and perhaps his whole fortune, to the utmost jeopardy. The mining systems are far in advance of those of slate quarrying, and this, I believe, is due to the fact that those superintending are well up to their calling, and so cause the right stroke to be struck in the right place. An excellent mining authority has thus remarked:—"There is much propriety in the remark that 'system is the handmaid of science,' and the term may be considered as used in contradistinction to disorder, irregularity, or random. The man who would excel in the important work of mine surveying should have a system, and a good one. It is true men are apt to be bigoted in this matter, and think so highly of their own system as to despise all others; but certainly one must admit that a bad or imperfect system is better than no system at all. He who has no fixed rule is liable to error every step he takes." The same authority further remarks:—"Whoever attempts to conduct the operations of a mine without a perfect working plan is not fit for his office. The very circumstance of his supposing himself capable of doing so is a certain proof of his ignorance." What has been said by this unquestionable authority regarding mining operations may also be said or applied with the same or greater propriety to the great wants and deficiencies in the slate quarrying line. I remember a lady asking me once: "What are plans and maps good for?" She held them in great derision! I do not know whether ladies are good authorities or not in such matters; however I leave that to the judgment of the readers. Some who are, and have been, in high trust in great undertakings have frequently vaunted in their infallible ability of being able to carry out or comprehend any complicated work within their jurisdiction with what they call their chief instrument—*i.e.*, their walking "three foot stick;" with this admirable mathematical instrument they contend that they are able to compete with any civil engineer, in any survey whatever, let him be ever so clever with his theodolite. Basing their supposition on the simplicity of their three whole number measuring-rods, thus dispensing with all fractions and decimals. Well some will say, if this is so, they must be extremely clever. Notwithstanding that, however, a reference to a simple fact out of some scores shall suffice at present to show so as to prove the veracity of the teachings and accuracy of the theories of such a bigoted whimsical walking-stick school. This incident thus occurred, the principal of this superior school set a number of men to drive a level through a portion of rock, stating to them at the same time that the distance to be driven would be about 30 yards; but one of the men being more accurate in his conjecture than his superior was in his mathematical reed calculations, replied by saying that they would be through by the time they had driven so many inches. With this remark the principal was very much annoyed, and was much more so when it turned out that the level did not exceed 3 ft. This is only one instance of such errors that frequently occur, but this error was the result of another mistake preceding it. So, this being as it is, it is sufficiently evident that the standard measuring-rods of this

school are far more applicable to the backs of its scholars, in connection for their irreparable errors, than for the surveying of complicated surveys. Many proprietors and workmen are at the present moment groaning under the prejudicial effects of such unbecoming maladministration, which are the natural issue of mere ignorance, and of which enough has been said to demonstrate the practice. What the quarryman really wants is some real and substantial system whereby he may be enabled to carry on successfully the arduous duties entrusted to him, and this should be done in as succinct a manner as the nature of the work would permit. I shall again make a few remarks on the slate quarrying mania period. THOS. GILL JENKINS.
Blaenau, Festiniog, Oct. 28.

THE PRESENT OUTLOOK OF MINING IN CORNWALL.

SIR,—In the midst of the gloom that has periodically been thrown over mining in the county, through the dishonesty of officials in whom implicit confidence was placed by their employers, it must be consoling to those interested in Cornish mines to view their present outlook, which is both cheerful and encouraging. Notwithstanding the price of tin has a downward tendency, there is nothing serious to anticipate from the present state of the market, and there is no valid reason set forth by the modern prophets why the longed-for rise and stability of the market may not be near at hand.

Judging from the last meetings and reports, the condition of two of the most important mines in the county—Wheal Agar and South Frances—may naturally lead one to the conclusion that their appearance in the Dividend List is only a matter of a short time, unless those casualties which no mine is proof against should again throw them back. The confidence of the adventurers in these mines is not misplaced. It has been known for many years that if the water could be kept out of the bottom workings the hopes of the adventurers would be realised, as the productiveness of the lodes is beyond question. In spite of all the agents could accomplish accidents have from time to time occurred and deferred the hopes; but now it is trusted that the tide has turned, and that nothing further will transpire to prevent the adventurers from receiving the dividends they so richly merit.

There is another tangible proof of what steady perseverance and determination in mining will do in the recent discovery at West Frances, upon which the adventurers are to be heartily congratulated. They have for long had uphill work, as the amount paid per share will testify. In my opinion very few things are gained now-a-days without trying for, unless it is a bad name.

The last meeting of Pedn-an-drea has buoyed up the hopes of many that in spite of its shortcomings hitherto it may yet turn up trumps, and looking at its prospects generally there is no earthly reason why it should not. Other mines in the West are likely to declare themselves off the sick list before long. Such would have been the case long ago if the prayers of mining speculators availed anything. Of late the prospect of St. Agnes district have much improved, and the period may not be remote when its dividend mines will be substantially augmented. So that taking the county generally the outlook of mining is much more cheerful than it has been only in recent times, and tin producers may congratulate themselves on the fact that foreign production has not brought about the oft-times predicted stagnation of the tin market. They have nothing to fear in this direction from Mount Bischoff; but it may be said of that wonderful mountain, with reference to its effects on the tin markets, that it has been in labour and brought forth a mouse.

Perranporth, Oct. 30.

W. NINNESS.

A DISCURSIVE VIEW IN THE INTEREST OF MINING— No. II.

SIR,—What are the facts which inform and guide the practically intelligent miner in the devious pursuit of his calling, which commands his confidence and stimulates his energies and perseverance—they are entities within the scope of his personal knowledge and observation; natural realities which disclose and assert themselves to the uninitiated, not theoretical merely but positive—positive as to the fact of their being, their symmetry, proportions, and other characteristic features, and the product of their development in the past. Theoretical as to the future, but analogically so—a superstructure of reason from a basis of facts, natural and experimentally demonstrated realities. If some of the effects of dynamic force betray spasmodic symptoms, as they certainly do, especially in mountainous regions, there is no reason whatever why man should imitate an accidental local occurrence in Nature arising from the violent action of her greatest disruptive energy and force, which when normally exercised lifts and tilts mountain masses bodily. Again and again is this phenomenon to be seen in the mountain chain of this region. Epoch succeeding epoch is hieroglyphed on the lofty brows of the latest upheavals, whilst underneath rude masses of broken and dismantled material lie scattered, cowering and crestfallen at their base. That such rocks were in their day and generation the nursery ground and repositories of the precious and other metals is evidenced from the quantities of ore which have been found in many places, bestrewn the surface and commingling in the general confusion. At what depths and in what volume sectionally the disrupted rocks were dismembered with their valuable enclosures of precious and other metalliferous minerals cannot be determined, as a succession of upheavals have accumulated, each later one underlying the others, the crust of the latest constituting the axial ridge of the range. The immensity of mechanical force which must have been exerted to produce such effects is not only incalculable, but inconceivable. To an untravelled Englishman it is scarcely possible to convey adequate ideas of such phenomena; but I have been led to notice it because it lies in the way of my discursive view of mining, and because of the fact that what appears in some instances as the effects of Nature's spasmodic efforts are in reality no more or less than marginal movements of vast masses of rocks, occasioned by the violent action of disruptive forces in their immediate or more remote vicinity, and to show that in and of such marginal rocks slides occur of immense masses down declivities in which are lodes of metallic ores and other veins corresponding in extent to the displaced masses and their relative original position *in situ*, the counterpart of which longitudinally and in depth must be sought for at other points, and probably in different directions. It is sometimes found that in such displaced sections a lode or lodes of excellent promise and produce are met with which can be traced cropping up at the surface for hundreds of feet in length; excitement rises to an almost ungovernable pitch in respect of its superficially indicated value; but, alas! it is soon discovered on working that its extent of treasure is rock bound in the section referred to, and that the knowledge which directs its circumscribed destiny has no ken beyond.

It was, but is not. It produced a more rapid circulation of the blood in several systems of corrugated humanity, but was of insufficient duration to sustain first impressions or to attest the validity of its title to anything but a disappointing episode. A sensation, an ephemeral, which contemporary history hastens as speedily as possible to consign to forgetfulness. But not to the tranquil metalliferous zones, which are unaffected by such agencies. Their anatomy is undisturbed, the working of their systems in full play, the aqueous and electric currents pursue their respective courses throughout the several venous systems to which they are crystallised as principal agents in their accumulation, deposition, and crystallisation of metallic mineral. It is in such zones that mines sustaining the prestige of their order, and in all probability will still be found to the end of time.

Where the operations of law have been rudely disturbed by the ravages of dynamic force it constitutes an epoch in respect of the member or series of members so affected transition sets in retrogressively and proportional to the progress of time will be the decadence and determination of values.

It will not, I think, be denied that the ores of commerce are a product of Nature, and if produced, from whence, it may be asked, and by what process they are derived. That they are extracted from sundry rocks by the solvent agency of water, conveyed to and deposited in fissures and other repositories by a natural process of precipitation in a cement or pulp form; mineralised from their associations of affinity for other substances, and subsequently become

crystallised by electric agency is abundantly evident to a critical or even to an ordinary observer. But I am not intent on discussing the origin of metals on this occasion, but the probabilities of their whereabouts and the indices of their existence, the order of their deposition, the evidences of continuity, permanence, and more or less abundance—prospectively—as what is already demonstrated needs no argument or controversial discussion in proof of its character, individuality, or identity, as it at once becomes an object, if not a standard, of reference in pursuance of practical mining.

It would almost appear from what one perceives going on around that practical experience was the least and most undesirable qualification for the discharge of the onerous and important duties associated with mine management, unlike every other industrial enterprise, comprising a combination of sciences and art, the knowledge of "how to do it" appears to be the least of all esteemed.

Zone, Nye County, Nevada, Oct. 9.

ROBT. KNAPP.

THE COAL RESOURCES OF QUEENSLAND—No. III.

With regard to the southern coal fields, the Rev. J. E. Tenison Woods states that all around Pine Mountain and Peak Mountain, and for a distance of many miles to the south and west, there are outcrops of coal which are still in need of exploration, and will hereafter considerably add to the coal resources of Queensland. Referring to the Walloon coal, the author states that about six miles west of Ipswich and 30 miles from Brisbane is the Walloon Colliery. The proprietary of the mine is Messrs. J. Callaghan and Co.; but a company is now being formed in England to work the seams. These are three in number; the first crops out on the surface with a dip to the south-west of 1 in 9; the seam is remarkably compact, with about 4½ ft. of coal. The second seam is 50 ft. below, with 5 ft. 6 in. of good coal. A third seam is found 40 ft. deeper, with a seam of about 5 ft. thick. This coal differs completely from all the other seams found around Ipswich; it is perfectly clean and compact, and does not soil the hands; it is not brittle, so that there is little or no slack in the handling; it has a smooth, bright, jet-like lustre, with bright bituminous streaks. As a gas coal it has no equal in the colony, and also as a household coal; it burns so freely that it may prove very valuable as an oil coal. The average of a number of proximate analyses would give a percentage of 50 fixed carbons, 40 hydrocarbons, 6 of ash, 4 per cent. for loss, moisture, and other ingredients. Some specimens do not coke well; others yield about 50 per cent., bright and well swollen up. At present there are about 15 men employed in the pit; but the extensive preparations that have been made will necessitate the employment of a great many more hands. Materials for a tramway for coal wagons have been laid down; this tramway leads from the mouth of the pit to the Walloon railway terminus, the distance being about half-a-mile. When these operations have been finished the promoters expect to raise at least 55 tons a day. The wagons are drawn from the pit by means of a 12-horse power standing engine, and run along iron rails. A pump of sufficient power is erected on the works, and only three hours' pumping daily is requisite to keep the mine free from the influx of water.

The difference of the character of this coal from any other led Mr. Tenison-Woods to suspect that there might be a difference in age from that of the Ipswich seams; but the fossils are the same—*Thinifeldia odontopteroides* (Morris). He found here also a great abundance of a fossil *Equisetum* (*E. rotiferum*, nobis), which he has not observed elsewhere. The species appear to be new, but closely allied to one found in the Rajmahal coal beds of India, and in the oolitic coal of Scarborough, in Yorkshire. Four miles further west coal has been found near the Rosewood station; the seam is of excellent quality, but only 1½ ft. thick. Ten miles south of Gatton, which is sixty miles by rail from Brisbane, a fine seam of coal crops out on Blackfellow's Creek; this, according to Mr. Gregory, contains about 9 ft. of workable coal, which is horizontal, and offers great facilities for working. The coal is a hard Cannel coal of a specific gravity of 1.29; its analysis showed fixed carbon 36; volatile hydrocarbons, 47; ash, 17 per cent. At Flagstone Creek, at the foot of the main range and six miles from Toowoomba, a seam of a similar character, but smaller, is found.

The main range is, generally speaking, a volcanic plateau lying on the coal measures, with eolian sandstones often intercalated between. Wherever the volcanic rock is interrupted the coal formation crops out over many hundreds of square miles. In sinking wells, when the upper stratum of basalt is pierced, seams of coal of varying thickness and quality have been cut. Extracts are given from Mr. Gregory's report with reference to the richer deposits on the Darling Downs. It appears that six miles W.S.W. from Cambooya railway station, in the bed of Hodgson's Creek, large blocks of coal, some exceeding 1 cwt., have been drifted out of the water holes; and the carboniferous shales and soft sandstones are largely exposed on the west side of the creek, extending nearly ten miles to the south-west. The coal is of excellent quality, being hard and capable of standing carriage and exposure to wet without injury; it does not make good coke; specific gravity, 1.33; volatile in coking, 45; fixed carbon, 42; ash, 13 per cent.

The Clifton Coal Mine is situated two miles beyond the Clifton railway station, close to the east side of the line. Two shafts have been sunk, and a bed of coal 4 to 5 ft. thick is worked at a depth of 60 ft.; a second seam of 2 ft. at 80 ft.; and a third of 1½ ft. at 100 ft. have been cut in the principal shaft. The upper seam, which is the one worked, produces good coal, varying from bright bituminous to dead black oil coal, all being very hard and tough, so that it bears carriage without breaking; it produces a high percentage of gas or oil according to the mode of treatment. Specific gravity, 1.26 to 1.35; volatile in coking, 48; fixed carbon, 42; ash, 10 per cent. The second seam is better suited for coke, as it cokes in heating. The lower seam is very hard oil coal. Specific gravity, 1.32; volatile in coking, 47; fixed carbon, 37; ash, 16 per cent. Situated in an extensive tract of open, nearly level, country, the strata seem to have but little inclination, but the general dip seems to be a little to the west. To the eastward the coal rocks are covered by basalt, the edge of which is between the two shafts of the mine, the eastern one being sunk through a considerable thickness of hard blue metal; and at the junction of the igneous and coal rocks a bed of earth was found containing fragments of fossil wood, with the leaves and seed-vessels of plants belonging to a period much more recent than the coal strata. Owing to the porous character of the basalt the mine is much troubled with water, and the roof being of soft shale much timber is required to secure the workings; but these difficulties will probably decrease as the workings progress on the rise of the seam, the present workings being nearly in the lowest part of the plain. The Clifton Mine is not now worked owing to the difficulties and expense of transit; but when a market is opened up from the present railway to deep water on the south side of Brisbane, to which reference will be made presently, all these difficulties will be overcome. The basins on the plateau appear to be geologically older than those of Ipswich. Those fossils which Mr. Tenison-Woods has identified are of Lias age—the well-known *Otocamites mandelohi*; this is found very widely distributed in Europe, Asia, and Africa, and always in Liasic deposits.

Before leaving the subject of the coal formations connected with the port of Brisbane, a few statistics are given to show the present state of the coal trade. The average weekly consumption of coal on Queensland railways is—S. and Western, 250 tons; Maryborough, 40 tons; Bundaberg, 7 tons; Central, 70 tons; Northern, 25 tons—392 tons. Quantity of coal raised in the West Morton district during the years 1880 and 1881 respectively, 56,552 tons, 62,012 tons, and 90,000 tons. This output is, of course, quite inadequate to the quantity which is in demand. Besides this, in 1882, 56 vessels, representing a tonnage of 27,994 tons, left the port of Brisbane to load coals at Newcastle, in New South Wales; this they would not do if there had been any convenience for loading with coal at Brisbane, a defect which will be remedied in a few months. The Government have nearly finished the construction of a railway which branches from the Ipswich line to the south side of the River Brisbane. By this means the trucks can be brought to deep water, where vessels of the heaviest tonnage can load by shoots from the wharf. Private enterprise must, of course, give effect to this work; and there can be no doubt that as soon as some of the projected coal companies are floated

very few vessels will leave the port of Brisbane without coaling, and the supply will easily equal the demand.

With regard to the Northern coal fields, the author states that between the Mary river and the Burnett the coal formation reappears, and several most valuable seams of coal crop out on the Burrum river, about 18 miles a little west of north from Maryborough. This is a basin which undoubtedly will prove as valuable to the colony as that on the Bremer. The Government have constructed a railway from Maryborough to Howard, the central township on the Burrum river. In the course of time it may be expected that this coal will command a larger share of the Pacific trade. The principal colliery is that of the Queensland Land and Coal Company, an English association, the managing director of which is Mr. J. Hurley. This colliery has one shaft, 10 ft. square, which cuts the Beaufort seam; this shows 3 ft. 8 in. of good hard coal, excellent for fuel, steam, and other purposes. The mine was worked by a drive on the outcrop previous to the formation of the company; but this is not now used. An expenditure of 17,000*l.* has already been made in developing the property; besides this, a complete rolling stock, steam saw-mill, brick-making machine have been put on the ground, rendering the mine equal to an output of 500 tons a day. The works are the largest in the colony, and the company has orders at present to the extent of 3000 tons per month.

In this colliery there are three seams—the first a foot or 18 in. of good clear coal, with other smaller bands; then there is 70 ft. of shale with fossil plants, shells, and fish in abundance, which are at present under examination to determine their age. Then comes the Beaufort seam; 60 ft. below this is what is called the Hartley seam, which is supposed to be the best, but is not now worked, as the Beaufort at a higher level is more than sufficient for present requirements. The dip of all the seams is north, and the angle between 11 and 12°. On the area of land belonging to the company there is calculated to be about 4,000,000 to 5,000,000 tons of the Beaufort seam available. There are two coal mines on the south side of the Burrum river—Walsh's, with two good seams, and Torban Lea, with one seam of very good coal, producing about 500 or 600 tons a week.

On the Burnett river, 60 miles north of the Mary, is the town of Bundaberg. At about 18 miles from the mouth, close beside the railway, there are five or six seams of coal cropping out. The coal is of that compact character which has been described as peculiar to the seams at Walloon; it is very valuable, but as yet none of the coal is worked. The Dawson and Mackenzie rivers, two of the principal tributaries of the Fitzroy river (on which Rockhampton is built), flow through a coal basin of the same age as the rich Newcastle seams of New South Wales. This is the basin of the Mackenzie and Dawson rivers, forming an immense area of many thousand square miles. In many places beds of carbonaceous sandstone crop out full of the common coal fossils of Newcastle, New South Wales, such as *Glossopteris browniana*, *Sphenopteris plumosa*, &c. These are never mingled with any characteristic fossils of the Ipswich coal basin, such as *Thinnfeldia odontopteroides*, *Alethopteris australis*, *Podocarpites distans*, &c. No boring has yet been attempted; but Mr. Tenison-Woods has no doubt that seams of very valuable coal may be expected where the fossils occur. Cracow Creek on the Dawson, and Weelwongera Creek on the Nogoa, are both places which might be advantageously tested.

At a short distance beyond Blackwater on the Central Railway, 120 miles west of Rockhampton, a seam of coal was found in cutting through an embankment; it was a very sulphurous coal; but if borings were persevered in other seams of good coal would surely be found. At the Drummond range between Withersfield and Bogantungan an anticlinal axis of a formation is crossed which, by its fossil plants (*Lepidodendron*, *Calamites*), &c., most certainly belongs to the lower carboniferous of Europe. In New South Wales coal has not been found in connection with this formation; but it should be tested in this colony, for it may prove to be the most valuable of all our coal deposits. The locality is about 216 miles west of Rockhampton.

Many large seams of coal of palaeozoic age have been found on the Bowen river; but none of them have been found available owing to the curious fact that repeated intercalations of volcanic matter has destroyed the seams; others, however, may yet be found out of reach of the volcanic influences. On the railway line between Townsville and Charters Towers indications of coal have been met with. The existence of seams, their extent and value, is still a matter of investigation. Coal has been known in the neighbourhood of the Palmer river since 1872. The seams are small but of excellent quality, and according to Mr. Jack between the ages of carboniferous and permian. An impure coal has been found on some of the tributaries of the Endeavour river, about 30 miles from Cooktown. There is a large development of the carboniferous rocks in this locality, and many impure coal seams. As the country becomes better explored better seams may be expected. A good coal field in this locality would have the most important influence on the India and China trade.

In conclusion, Mr. Tenison-Woods remarks that as Queensland is only partially explored, and, geologically, scarcely explored beneath the surface except on the gold and tin mines, its mineral riches are yet but little known. Notwithstanding this the fact that the coal formations cover so vast an extent of the Territory, and so many valuable coal fields having been discovered, makes him confident in predicting that its resources in coal are enormous—are equal, if not superior, to any other colony, and will raise her shores to be in the end the grand coal emporium of the Southern Hemisphere.

LOCAL SCIENTIFIC SOCIETIES.—The rapid increase in the number of people who take a mild sort of interest in science has resulted, says Science Monthly for November, in the foundation of innumerable "philosophical societies" and "field clubs" throughout the country, many of which annually blossom into printed Transactions, and the alarming addition to our scientific literature which this obviously implies is the cause of much groaning on the part of professional workers. The contents of these Transactions is an unknown quantity—often very much unknown. There may be one paper of sterling value on the local flora, a second may deal perhaps with a problem of wide interest in a really original way, and a third may be devoted to a remarkable and unexpected occultation of several fixed stars by (as subsequent enquiry discloses) a fly on the green observer's object-glass. Yet the earnest worker feels bound to look through all such collections, in case, by failing to do so, he should miss something of real importance. The task is not by any means insignificant, and it is an excessively irksome one to busy men. We need not be surprised, therefore, that they loudly complain, for in a certain measure their complaint is just. But what is to be done? Amateur dabblers would cry out—and with reason—if they were to be denied the right to speculate upon the mysteries of the cosmos merely because their speculations sometimes happened to be nearer the truth than those of their professional brethren. And still more would they complain if they were to be allowed to observe and speculate and publish away as much as they chose, and have the results of their labour calmly ignored by those who condense and crystallise our knowledge for us. The suggestion of Nature, then, seems well suited to the case—that in the matter of publication all local societies should confine themselves to local investigations, for which they are especially qualified, leaving the larger questions to be dealt with by the societies in London. This does not preclude aspiring members of the smaller societies from soaring as high as they like, only if their soarings are to any purpose they have the honour of appearing in the London Transactions instead of in those of their own bodies. And further, it leaves the parent societies free to devote all their attention to the broad questions connected with their respective branches of knowledge instead of pottering over local details. Of course there are difficulties. Of course there would be heart-burnings, and envy, and ill-feeling when little Sniggs, of the Kennington Oval Field Club, got his paper on the Geographical Distribution of the Boulder Clay into the journal. Of course the eminent Sir John Smith would feel just a little vexation (deny it how he might) on finding his invaluable memoir on Devonshire apples relegated to the Morebath Transactions. But some plan of the kind is worth trying. The time, labour, and bother generally that would be saved through all the provincial organisations

co-operating with the metropolitan ones, and arranging their material for publication on a systematic plan, is simply incalculable, and would enable scientific men to well-nigh double the duration of their working lives.

MODERN BLASTING AGENTS.

One of the first requirements in carrying out mining, quarrying, and tunneling operations, is, says Iron of yesterday, the dislodgment of large masses of rock and other similar natural formations as quickly, safely, and cheaply as possible. For many years the only explosive agent at command was gunpowder, and in many cases the process of blasting was slow and unsatisfactory, particularly in wet or very hard ground. In course of time, however, chemistry came to the rescue of the miner, and gave him the means of blasting in the wettest ground and in the hardest geological formations, where previously he was, in the one case, unable to "keep his powder dry," and, in the other, to get any ground at all, especially in vertical holes. Modern chemistry has produced a long list of explosives of a far more powerful character than gunpowder, some of which have found their way largely into practice for mining and general blasting purposes. The tendency of invention in this direction has been to produce an explosive compound which shall develop a greater power than gunpowder, and which shall consequently perform an equal or greater amount of work with a lesser quantity of explosive, and above all, which shall not be explodable except under the actual conditions of work. Of the numerous attempts which have been made to supersede gunpowder for blasting purposes, only a few have succeeded, owing to the delicately sensitive nature of the ingredients or to some other equally objectionable feature. These unsuccessful attempts form a long list, which it is not necessary here to consider, our object being to indicate the practicable rather than impracticable results of scientific research in this direction of late years. The successful attempts can be counted on the fingers' ends; they relate mainly to nitro-compounds, of which gun-cotton, dynamite, and lithofracteur are the chief.

Although gun-cotton and kindred explosive agents possess a wide sphere of usefulness, especially with regard to military purposes, that sphere does not include mining operations. The rigidity of gun-cotton and similar cartridges is a great disadvantage in charging the bore-hole, the charge being liable to stick fast, and this has, in fact, been the cause of accidents in the past. The plastic nature of dynamite and lithofracteur, on the contrary, permits of the cartridge adapting itself to any irregularities that may occur in the bore-hole, so the operation of charging is facilitated, and one great source of danger is absent. Hence the nitro-glycerine compounds are greatly preferred to those explosives which in their nature are rigid and incompressible. As a natural result, and seeing that the power of well-made standard dynamite—that is, dynamite containing 75 per cent. of nitro-glycerine and 25 per cent. of kieselguhr—is equal to that of pure compressed gun-cotton, dynamite has taken a firm stand as one of the most practically useful explosive agents for industrial purposes. The practical introduction of dynamite in this country took place in 1867, and we well remember the first public demonstration of its power and usefulness at some quarries in Surrey. According to statistics given by Sir Frederick Abel in his inaugural address as President of the Society of Chemical Industry, and published in our issue of August 31, 1883, it appears that in 1867 the sale of dynamite was 11 tons only. The sales, however, rapidly increased year by year, so that in 1877 the annual sales from Nobel's dynamite factories alone were 5500 tons, whilst in 1882 they reached 9500 tons. This, however, by no means represents the total amount of dynamite made and used, for Sir Frederick states that he does not include several other factories on the Continent, where considerable quantities of dynamite and similar preparations are made.

Hence we see that, from being what we may call a luxury in the hands of the miner, enabling him to effect his object with greater rapidity, certainty, and safety, dynamite has come to be an indispensable necessity wherever mining operations are carried on. But although possessing many advantages, dynamite has two slight drawbacks. In the first place, it develops nitrous fumes after a shot has been fired. This causes great loss of time in close workings where the men cannot get back to their work until the noxious gases have cleared away. The development of these fumes is due to the fact that during combustion the atoms of nitro-glycerine are converted into gas with such enormous rapidity that in their divided condition—that is, when mixed only with an inexplosive absorbent, such as kieselguhr—they have not time to communicate explosion to each other throughout the whole mass of the charge, and a portion is consequently blown out of the bore-hole unconsumed. The energy developed by the explosion of the main bulk of the charge so acts upon the unconsumed portion of the nitro-glycerine as to convert it into vapour, which mixes with the atmosphere, and, with the smoke from the fuse, hangs about the face of the work for a considerable time. This it is which causes the fumes which are detrimental to health, and which enforce idleness on the part of the miner while waiting for them to clear off. On the other hand, the use of lithofracteur is not accompanied by this disadvantage, for it does not develop any fumes by its explosion if properly used, as has been demonstrated by practical experience in its use. The reason of this is that, whilst lithofracteur contains a smaller percentage of nitro-glycerine than dynamite, it also contains other ingredients, which, while acting as perfect absorbents, assist also in the explosion, and enable every atom of the nitro-glycerine to be exploded in the bore-hole, thus preventing any portion being projected into the air in the form of poisonous gas, the result of imperfect combustion.

The second drawback possessed by dynamite is, that its action, being exceedingly rapid, is more or less locally intensified, producing a smashing, rather than a rending, effect on the rock. This rapidity of action is due to the fact that nitro-glycerine is the sole explosive, the development of the power due to its combustion being enormously rapid. Lithofracteur, on the other hand, consists of nitro-glycerine, combined with a large additional percentage of other combustible and explosive absorbent media, and but a small proportion only of incombustible matter. The result is that the action and reaction of the ingredients of lithofracteur are so nicely balanced as to cause a retardation of the explosion. In other words, it is slower burning than nitro-glycerine, just as large grain gunpowder is slower burning than rifle grain powder, although weight for weight they may both develop the same power, but with a different result. This retardation causes lithofracteur to act with greater rending effect than in the case of other nitro-glycerine compounds, which have a smashing action. With lithofracteur the rock is not merely crushed to powder within a limited area around the bore-hole, but is rent and fissured—lifted, in fact—to a very wide extent, so that at each shot the miner gets much more ground. This has been proved by the use of lithofracteur, and the fact being recognised by practical men, it may be concluded that its merits only require to be better known for it to take its place with dynamite as a useful blasting agent. But whether this be so or not, it in no way alters the fact that there is a wide and increasing field for any explosive which enables blasting operations to be carried on with rapidity, efficiency, and economy, and that explosive at the present time is unquestionably dynamite.

TIN AND TIN MINING IN NEW SOUTH WALES.—Although the existence of tin was discovered by the late Rev. W. B. Clarke, an eminent colonial geologist, so far back as 1853, it was not worked until about 10 years ago, since which period there have been exported from the colony 48,055 tons of fine tin in ingots, in addition to 14,212 tons of ore, representing a total value of 4,339,577*l.* The number of miners employed in 1881 was estimated at 4530, of whom some were Chinese. In addition to the alluvial deposits of tin ore, there are numerous valuable lodes, but the latter have not yet been worked to any extent on account of the capital and skill necessary for their proper development. The alluvial deposits first worked were found in beds of existing creeks, but more recently tin ore has been found in large quantities in beds of old rivers or creeks, at depths varying from a few feet to 150 ft. In some cases these deposits are covered by basalt. The extent, so far as known, of our stanniferous deposits is at least 5,440,000 acres; but it will probably

be found more extensive than this, as Mr. H. Y. L. Brown, geological surveyor, has recently discovered tin ore at the Granite Diggings, in the north-western portion of the colony, in the direction of Queensland. The tin-bearing localities hitherto worked are situated about the highlands of the Great Dividing Range in the northern and southern districts. Several lodes of cassiterite have been opened, as at Tingha, Elsmore, Newstead, the Gulf, Jingellic, &c.; they occur chiefly in eutritic and micaceous granites. But nearly all the ore hitherto raised is stream tin, obtained from the tertiary and quaternary drifts, where these are composed of the detritus from the stanniferous granites. Gold, wolfram, metallic bismuth, and carbonate and sulphide of bismuth are occasionally found with the tin ore; sulphide of tin rarely. The concretionary variety of tin oxide called "toad's-eye" tin occurs in the pliocene gold drifts at Grenfell. From this it will be perceived that there exists in the colony abundant scope for tin mining enterprise.

NOVEL ROTATING QUARTZ CRUSHER.

Although the old-fashioned crushers and stamps have been made to do good work in the preparation of mineral for subsequent treatment or for market, the necessity for rapidity and the utmost economy in order to keep pace with the high-pressure system of business now almost universal, has led inventors to use their best efforts to combine processes which were formerly regarded as distinct, and to reduce the handling of the ore to a minimum. Where there is an abundance of water-power and time is of comparatively little object the stamps can scarcely be surpassed for economy; but in the vast majority of cases some form of crusher has been found more convenient. In the most approved form of crushing machine hitherto in use a house of two floors is so arranged that the upper floor can carry the crushing gear. On one shaft a thick cast-iron roller, some 2 ft. long and from 2 ft. to 3 ft. in diameter, is firmly keyed, and a similar shaft and roller is fixed parallel to it at suitable distance, and so that the two may be geared together with equal toothed-wheels, the crushing rollers thus rotating towards each other at the top. Transverse levers keep the rolls in contact, such levers being weighted to suit the hardness of the ore under treatment. It will be readily understood that with such an arrangement not only is there considerable difficulty in ensuring the desired degree of fineness, but the whole apparatus is clumsy and costly; in fact, of a character that would prevent its being erected at all, except when the exact nature of the permanent works required had been definitely ascertained. It is, however, at least as important that the mineral should be treated as economically whilst a property is in process of development as at any other time, so that a machine which should at one operation reduce the roughly spalled ore to such a degree of fineness as would permit of its being at once chlorinated or otherwise treated for the immediate separation of the metal was absolutely wanted.

Such a machine has now been designed and manufactured, and has been put to work in London as a practical demonstration of the value and efficiency of the system. Sutherland's Quartz Crusher and Minerals Pulveriser, for so the machine is designated, is very compact and does its work admirably, and really appears to reduce hard, soft, and tough materials to a given fineness with equal facility. It is claimed that half a ton of mineral per hour can be passed through and reduced to sieving fineness of 120 meshes to the linear inch, or 14,400 holes to the square inch; and although on Monday, from the small parcels of the different ores available, the result of an hour's run was not actually seen, the facility with which each class of ore was pulverised left no doubt that the claim could be substantiated in regular working. It is remarked that the highly important bearing of this invention upon the mining and metallurgical interests of the world in general is evidenced by the fact that this machine is of more durable construction and more economic in operation than stamp batteries, mill stone, or any other method of mineral reduction hitherto employed. It is, moreover, pointed out that the delay and expense constantly attending the use of stamp batteries is entirely obviated, while the great facility with which the most refractory ores are ground by the Sutherland machine to an almost impalpable powder renders this invention of the utmost importance as an auxiliary to the economic treatment of such ores, whether by chlorine, mercurial, or other processes.

The Sutherland machine consists of a basin, the inner side of which is enlarged to receive corrugated steel surfaces towards the top. Within this basin there rotates a grinder of corresponding form, the corrugated crushing surfaces being so arranged that the distance between them gradually diminishes from the top downward. Both grinders are made of best cast-iron, and the corrugated faces are merely held in position with webs, so that they can readily be renewed when worn out. The side frames are of cast-iron, with faces planed true and bolted together. Cross bars are planed on faces, and drilled true with turned bolts to fix same to side frames, the upper one having either a gun or Babbitt's metal nut, with a 2 in. square threader screw, fitted with hardened steel centre and cast-iron hand-wheel, the centre one to be fitted with gun-metal bearings bored to fit upright shaft, and turned outside and on faces, the lower one to be planed on faces, and have a recess cast in same to keep the spring central. The vertical shaft is of steel, turned, planed, and fitted with hardened steel centres. The spring beneath the vertical shaft is made strong enough to carry weight of inner grinder, steel ring, shaft, driving wheel, &c. The crown and pinion wheels are of cast-iron, turned and keyed on true, the keys to be recessed into shaft. The horizontal driving shaft is of steel turned and keyways recessed in, and the bearings are of gun metal.

IMPROVEMENT IN ROCK-DRILLS.

In that class of drill in which the boring-tool is carried by a reciprocating and rotating piston, Messrs. LAMMUTH and HOWARTH, of Pendleton, propose some improvements, the objects of which are to economise the consumption of the said fluid pressure, and generally to simplify and render more efficient the class of machine under consideration. Rock-drills as hitherto constructed are usually furnished with a valve which directs the pressure through ports to the interior of the cylinder. In many instances these ports are of considerable length and capacity, and have to be filled with pressure at each stroke of the drill. In accordance with their invention they form on or attach to the cylinder a valve chamber equal in length to the cylinder, and containing a valve consisting of a spindle, having a slide valve at each end, which works over inlet and exhaust ports leading to the interior of the cylinder, the length of the said ports being equal only to the thickness of metal of the side of the cylinder where the valve is applied.

By this arrangement the pressure has only to fill at each stroke a port of small capacity instead of a long passage of large capacity as heretofore, and consequently a great saving of the fluid pressure employed is effected. Another improvement which they apply to the valve consists of an arrangement for locking the valve in position when it has been moved one way or the other so as to prevent the shock of the blow from disturbing the valve. The central part of the valve spindle is enlarged and recessed to permit the introduction of the tail of a three-armed tumbler, which is pivoted on a fulcrum fixed to the cylinder. The curved shoulders of a recess turned in the piston act alternately upon each of the two lower arms of the said tumbler, and cause it to rock upon its fulcrum, and by means of the third arm to reciprocate the valve. In executing this movement, which is effected without the shock which is so destructive to the cams of ordinary rock-drills, the nose of one of the lower arms slides up the curved shoulder on the piston and rests upon its circumference, while the other arm is depressed, so as to act upon the bottom of the recess in the piston. The tumbler is thus held immovable between these two points, and prevents any accidental shifting of the valve when the blow is delivered.

The improvements relate further to the means for advancing or feeding the boring tool when the machine is in action. Under the arrangement at present in use when the feeding screw and nut have become so worn as to permit of a little play the shock of the boring tool cause great jarring of the screw and feeding handle, and are the occasion of inconvenience and injury to the operator. To obviate this disadvantage, and to increase the usefulness and durability of

the said feeding-screw and nut they apply a secondary binding nut to the screw in the rear of the usual nut. The said binding nut is carried on screwed studs projecting from the rear of the machine in line with the feed screw, and by tightening nut on the ends of the said studs the secondary binding nut is forced towards the feed nut, and the feeding screw is pinched between the nuts and prevented from jarring, or the distance between the nuts may be increased to obtain the same result.

PROVINCIAL STOCK AND SHARE MARKETS.

CORNISH MINE SHARE MARKET.—Mr. S. J. DAVEY, mine share-dealer, Redruth (Nov. 1), writes:—We have had a very dull market this week, and no particular change in prices. At West Frances meeting to-day an excellent report was presented, and a 40s. call was made. Subjoined are the closing quotations:—Blue Hills, $\frac{1}{2}$ to $\frac{1}{4}$; Carn Brea, $\frac{3}{4}$ to $\frac{1}{2}$; Cook's Kitchen, $\frac{1}{2}$ to $\frac{1}{4}$; Dolcoath, $\frac{1}{2}$ to $\frac{1}{4}$; East Pool, $\frac{1}{2}$ to $\frac{1}{4}$; Pen-an-drea, $\frac{1}{2}$ to $\frac{1}{4}$; South Crofty, $\frac{1}{2}$ to $\frac{1}{4}$; South Frances, $\frac{1}{2}$ to $\frac{1}{4}$; Tincroft, $\frac{1}{2}$ to $\frac{1}{4}$; West Basset, $\frac{1}{2}$ to $\frac{1}{4}$; West Fildice, $\frac{1}{2}$ to $\frac{1}{4}$; West Seton, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Agar, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Basset, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Grenville, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Peewee, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Kitty, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Uny, $\frac{1}{2}$ to $\frac{1}{4}$; West Tolgus, $\frac{1}{2}$ to $\frac{1}{4}$.

—Messrs. ANDREWS and WICKETT, stock and share brokers, Redruth (Nov. 1), writes:—There has been but little doing during the last week, and almost all shares are lower. Closing quotations here:—Blue Hills, $\frac{1}{2}$ to $\frac{1}{4}$; Carn Brea, $\frac{3}{4}$ to $\frac{1}{2}$; Cook's Kitchen, $\frac{1}{2}$ to $\frac{1}{4}$; Dolcoath, $\frac{1}{2}$ to $\frac{1}{4}$; East Pool, $\frac{1}{2}$ to $\frac{1}{4}$; Pen-an-drea, $\frac{1}{2}$ to $\frac{1}{4}$; South Crofty, $\frac{1}{2}$ to $\frac{1}{4}$; South Frances, $\frac{1}{2}$ to $\frac{1}{4}$; Tincroft, $\frac{1}{2}$ to $\frac{1}{4}$; West Basset, $\frac{1}{2}$ to $\frac{1}{4}$; West Fildice, $\frac{1}{2}$ to $\frac{1}{4}$; West Seton, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Agar, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Basset, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Grenville, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Peewee, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Kitty, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Uny, $\frac{1}{2}$ to $\frac{1}{4}$; West Tolgus, $\frac{1}{2}$ to $\frac{1}{4}$.

—Mr. M. W. BAWDEN, Lishead (Nov. 1), writes:—The mining market continues dull and inanimate, and prices are mostly nominal. Subjoined are the closing quotations:—Bedford United, $\frac{1}{2}$ to $\frac{1}{4}$; Carn Brea, $\frac{3}{4}$ to $\frac{1}{2}$; Cook's Kitchen, $\frac{1}{2}$ to $\frac{1}{4}$; Dolcoath, $\frac{1}{2}$ to $\frac{1}{4}$; Devon Consols, $\frac{1}{2}$ to $\frac{1}{4}$; Devon Great United, $\frac{1}{2}$ to $\frac{1}{4}$; East Pool, $\frac{1}{2}$ to $\frac{1}{4}$; East Frances, $\frac{1}{2}$ to $\frac{1}{4}$; Ganton United, $\frac{1}{2}$ to $\frac{1}{4}$; Glasgow Caradon, $\frac{1}{2}$ to $\frac{1}{4}$; Gunnislake (Ollerters), $\frac{1}{2}$ to $\frac{1}{4}$; Herodfoot, $\frac{1}{2}$ to $\frac{1}{4}$; Hingston Down, $\frac{1}{2}$ to $\frac{1}{4}$; Killfret, $\frac{1}{2}$ to $\frac{1}{4}$; Marke Valley, $\frac{1}{2}$ to $\frac{1}{4}$; New West Caradon, $\frac{1}{2}$ to $\frac{1}{4}$; Old Gunnislake, $\frac{1}{2}$ to $\frac{1}{4}$; Owen Vean, $\frac{1}{2}$ to $\frac{1}{4}$; Phoenix United, $\frac{1}{2}$ to $\frac{1}{4}$; Prince of Wales, $\frac{1}{2}$ to $\frac{1}{4}$; South Caradon (Limited), fully paid, $\frac{1}{2}$ to $\frac{1}{4}$; South Crofty, $\frac{1}{2}$ to $\frac{1}{4}$; South Frances, $\frac{1}{2}$ to $\frac{1}{4}$; South Devon United, $\frac{1}{2}$ to $\frac{1}{4}$; South Frances, $\frac{1}{2}$ to $\frac{1}{4}$; Tincroft, $\frac{1}{2}$ to $\frac{1}{4}$; West Basset, $\frac{1}{2}$ to $\frac{1}{4}$; West Caradon, $\frac{1}{2}$ to $\frac{1}{4}$; West Frances, $\frac{1}{2}$ to $\frac{1}{4}$; West Mary Ann, $\frac{1}{2}$ to $\frac{1}{4}$; West Seton, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Agar, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Basset, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Grenville, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Hony and Trelawny, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Kitty, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Jane, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Peewee, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Uny, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Basset, $\frac{1}{2}$ to $\frac{1}{4}$; West Frances, $\frac{1}{2}$ to $\frac{1}{4}$; St. Just United, $\frac{1}{2}$ to $\frac{1}{4}$.

—Mr. JOHN CARTER, mine share-dealer, Camborne (Nov. 1), writes:—The share market has been very dull during the past week, and very little business has been transacted. Tin has fallen about 20s. in London, and this has caused a corresponding fall in the price of mine shares. Subjoined are the closing quotations:—Carn Brea, $\frac{3}{4}$ to $\frac{1}{2}$; Cook's Kitchen, $\frac{1}{2}$ to $\frac{1}{4}$; Dolcoath, $\frac{1}{2}$ to $\frac{1}{4}$; East Pool, $\frac{1}{2}$ to $\frac{1}{4}$; Pen-an-drea, $\frac{1}{2}$ to $\frac{1}{4}$; South Crofty, $\frac{1}{2}$ to $\frac{1}{4}$; South Frances, $\frac{1}{2}$ to $\frac{1}{4}$; Tincroft, $\frac{1}{2}$ to $\frac{1}{4}$; West Basset, $\frac{1}{2}$ to $\frac{1}{4}$; West Fildice, $\frac{1}{2}$ to $\frac{1}{4}$; West Seton, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Agar, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Basset, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Grenville, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Peewee, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Kitty, $\frac{1}{2}$ to $\frac{1}{4}$; Wheal Uny, $\frac{1}{2}$ to $\frac{1}{4}$; West Tolgus, $\frac{1}{2}$ to $\frac{1}{4}$; Penhall, $\frac{1}{2}$ to $\frac{1}{4}$.

MANCHESTER.—Messrs. JOSEPH R. and W. P. BAINES, share-brokers, Queen's Chambers, Market-street (Nov. 1), write:—Beside the fact of to-day's holiday, and consequent reduction of aggregate of business, the amount done during the week is only very moderate taken altogether, and as regards the several miscellaneous series very meagre indeed. In railways there has not appeared to be any important factor acting generally in either direction; what changes there are, and they are neither numerous or severe, being due to individual influences. The market for foreign funds beyond a decided fall (2) in Mexican 3 per cent., and an adverse majority of alterations do not exhibit any very remarkable feature. Egyptian 5 per cent. is $\frac{1}{2}$ each lower, Russian $\frac{1}{2}$ also, and Peruvian $\frac{1}{2}$ down, whilst Argentine Hard Dollar Bonds quote $\frac{1}{2}$ higher. The rest of the changes are very few and fractional. Mexican railway stock has been quieter, not having recorded such violent fluctuations as they have done of late; they have, nevertheless, varied a little, but after having been rather easier have come back to within a trifle of prices ruling last week. Miscellaneous shares though very quiet are fairly steady as regards values taken all round.

BANKS.—Though fewer transactions are recorded than for many weeks last past, where business has been dull, and values have been obtained, showing market strong as regards quotations, changes of prices, though few, exhibiting the same tendency. Higher: Lancashire and Yorkshire Bank, $\frac{1}{2}$ to $\frac{1}{4}$; Manchester and Liverpool District, $\frac{1}{2}$ to $\frac{1}{4}$; Manchester and Salford, $\frac{1}{2}$ to $\frac{1}{4}$; Bank of Liverpool, $\frac{1}{2}$ to $\frac{1}{4}$.

INSURANCE.—Business done small in amount and straggling in character. Quotations most revised and results of revision irregular. Higher: Liverpool and London and Globe, $\frac{1}{2}$ to $\frac{1}{4}$; Ocean Marine, $\frac{1}{2}$ to $\frac{1}{4}$; Lower: Lancashire, $\frac{1}{2}$ to $\frac{1}{4}$; British and Foreign Marine, $\frac{1}{2}$ to $\frac{1}{4}$; and Queen, $\frac{1}{2}$ to $\frac{1}{4}$.

COAL, IRON, &c.—All dealings are reported as with one exception confined to Bolckow and Ebbw Vale, and altogether is with one exception total. Some severe changes are recorded in both directions—in Staveley Coal, &c., A for the better, and in Bolckow, Great Laxey Lead, and Tredegar A, for the worse. Higher: Staveley A, $\frac{1}{2}$ to $\frac{1}{4}$; Telegraph Construction and Maintenance, $\frac{1}{2}$ to $\frac{1}{4}$; and Panullicio Copper, $\frac{1}{2}$ to $\frac{1}{4}$. Lower: Great Laxey, $\frac{1}{2}$ to $\frac{1}{4}$; Tredegar A, $\frac{1}{2}$ to $\frac{1}{4}$; Bolckow fully paid, $\frac{1}{2}$ to $\frac{1}{4}$; ditto 12d. paid, $\frac{1}{2}$ to $\frac{1}{4}$; Ashbury's Railway Carriage, &c., $\frac{1}{2}$ to $\frac{1}{4}$; Ebbw Vale, $\frac{1}{2}$ to $\frac{1}{4}$; and Consolidated Telephone Construction and Maintenance, $\frac{1}{2}$ to $\frac{1}{4}$.

COTTON SPINNING.—No net dull, and small business doing. Prices turn lower, and apparently inclining towards further ease.

TELEGRAPHIC.—Neglected; no business reported. Globe Preference is $\frac{1}{2}$ up, and West Indian and Panama $\frac{1}{2}$ down. Western and Brazilian has been a little better; now same. TELEPHONES also neglected, and the only quotable change is a rise of $\frac{1}{2}$ in United.

MISCELLANEOUS.—Nothing of importance to record save a distinct fall in Gas Light and Coke, A, and a fair rise in Manchester Carriage; all issues.

RAILWAYS.—The week's changes are varied, and the results of different influences. Great Eastern and the several defunct stocks were higher at one time on traffic. Sheffield, A, has declined about 1, although traffic steadied them, and Great Northern, A, is lower on unfavourable trade reviews. Brighton, A, is lower on anticipated bad monthly return; but this coming out with 16000 increase brought about a rally, and they closed steady. Metropolitan Districts down on close of Fisheries Exhibition. North-Easterns lower on traffic, followed by other heavy lines except Midlands, which have shown a little animation. Canadians, after being better, have fallen away again, and at present no strength is visible on them. Americans firm till Wednesday, when they relapsed, and were depressed up to close yesterday.

NEWCASTLE-ON-TYNE.—Mr. S. N. CHALLONER, stock and share broker, Grey-street (Nov. 1), writes:—The demand for Armstrong's shares has continued, and at 132 buyers are 4 higher on the week, and 12 for the month. Bolckows are flat, A shares, 19 to 19 $\frac{1}{2}$, are 1 lower, and B, at 10 $\frac{1}{2}$ to 10 $\frac{3}{4}$, are 1 $\frac{1}{2}$ lower. Ebbw Vale, $\frac{1}{2}$ lower at 6 $\frac{1}{2}$ to 6 $\frac{3}{4}$; Gas Light and Coke, 6, at 199; Monkland Iron, 2s. at 64s. 6d.; Mason and Barry, $\frac{1}{2}$ at 14; Steel Company of Scotland, $\frac{1}{2}$ at 83 $\frac{1}{2}$; Tinsley, 2s. at 64s. 3d.; Panullicio, $\frac{1}{2}$ at 6; Consett Iron, without change at 23 $\frac{1}{2}$; Palmer, B, at 17 $\frac{1}{2}$, and A, at 27; West Cumberland Iron, 7 $\frac{1}{2}$; Consett Spanish Ore, 51s. 6d. to 52s. 6d.; Teeside Iron, 1 $\frac{1}{2}$; Darlington Iron, 20s.; Chillingham Iron, 20s.; John Brown at 62 $\frac{1}{2}$; O. Cammells at 67 $\frac{1}{2}$; Consett Water, at 8 to 6 $\frac{1}{2}$; Liverpool Gas and Water, A, 9 $\frac{1}{2}$; B, 8 $\frac{1}{2}$ to 7 $\frac{1}{2}$; Newcastle Gas, 171 $\frac{1}{2}$; Newcastle Water, 1 higher, at 176 to 177; Tynesmouth Gas, 3, at 176; Sunderland Gas, 4, at 178; $\frac{1}{2}$ lower, at 3 $\frac{1}{2}$ to 3 $\frac{3}{4}$; Lawes' remain, 5 $\frac{1}{2}$ to 6; Newcastle Chemicals, 40s.; Furness Railway Ordinary, 125; Maryport and Carlisle, 194 to 195.

SCOTCH MINING AND INDUSTRIAL COMPANIES SHARE MARKETS.

STIRLING.—Mr. J. GRANT MACLEAN, stockbroker and ironbroker (Nov. 1), writes:—During the past week markets have remained quiet. There is no appearance of improvement in the prospects of trade, and until there is more business doing no important advance in prices need be looked for.

In shares of coal, iron, and steel companies there has been little business doing. Chillingham, 20s. to 25s.; Cardiff and Swansea, 57s. 6d. Ebbw Vale have declined to 6 $\frac{1}{2}$.

In shares of foreign copper and lead concerns the principal business has been in Arizonas, which improved to 44s. 3d. on the meeting proving satisfactory, but are now easier, about 43s. to 44s. 3d. to 55s.; Norway Copper, 2s. 6d. to 7s. 6d.; Pierrefitte, 12s. 6d. to 17s. 6d.

In shares of home mines there is no particular change to notice. Coad-y-Fedw, 20s. to 25s.; Camborne Yean, 2s. 6d. to 3s. 9d.; Caradonshire Great Consols, 15s. to 15 $\frac{1}{2}$; East Devon, 5s. to 7s. 6d.; East Uny, 2s. 6d.; Goginan, 5s. to 7s. 6d.; Killfret, 27s. 6d. to 32s. 6d.; Llandhilly, 50s. to 55s.; Llandegla, 2s. 6d.; Langford, 2s. 6d.; North Grogwinion, 2s. 6d.; North Penstruthal, 5s.; North Blue Hills, 2s. 6d.; North Busy, 2s. 6d.; Old Gunnislake, 6s. 3d.; Pen-an-drea, 7s. 6d. to 12s. 6d.; Polroze, 5s.; Parys Copper, 2s. to 3s.; Penhall, 13s.; Rhosomors, 20s. to 30s.; South Crofty, 5s.; South Crofty, 8 $\frac{1}{2}$ to 9 $\frac{1}{2}$; South Frances, 7 $\frac{1}{2}$ to 8; Sorbridge, 1s. 6d. to 2s. 6d.; Sincclair, 19s. to 23s.; Tankerville, 1s. 6d. to 2s. 6d.; West Basset, 3 to 4; West Polbreen, 17s. 6d. to 22s. 6d.; West Fildice, 16s. 3d.; Wheal Grenville, 5 $\frac{1}{2}$ to 6; Wheal Jane, 10s. to 15s.; Wheal Kitty, 10s. to 15s.; and Wheal Uny, 20s. to 30s.

In shares of gold and silver mines prices are generally lower. Richmonds have declined to 5 $\frac{1}{2}$. Akankoo, 2s. 6d. to 3s. 9d.; Caankim Bamoo, 5s. to 7s.; California, 10s. to 12s.; Callao Bis, 6s. 6d. to 7s. 6d.; Colombian Hydraulic, 4s. to 6s.; Eberhardt, 5s. to 6s.; Guinea Coast, 2s. to 3s.; Gold Coast, 7s. 6d. to 10s.; Indian Consolidated, 3s. 6d. to 4s.; Isabella, 7s. 6d. to 10s.; Kapanga, 1s. 3d. to 2s. 6d.; Kohinoor, 7s. to 9s.; Montana, 37s. 6d. to 42s. 6d.; New Emma, 30s. to 40s.

35s.; New Callao, 5s. to 7s.; New Gold Run, 1s. 9d.; Organos, 16s. to 18s.; Potosi, 2s. 6d. to 4s. 4d.; Rio Grande, do Sul, A, 3s. 9d.; Victoria (Venezuela), 11s. to 13s.; West Callao, 10s. to 15s.; and Yuba River, 2s. to 3s.

In shares of miscellaneous companies the principal feature has been a heavy decline in oil shares, owing to the number of new companies floated recently. Home Mines Trust, 10s. to 12s.; Lawes' Chemicals, 5 $\frac{1}{2}$ to 6 $\frac{1}{2}$; Nobel's Explosives have declined to 25s.; Odan's Chemicals, 8 to 9 $\frac{1}{2}$; and Phospho-Guano, 30s.

EDINBURGH.—Messrs. THOS. MILLER and SONS, stock and share brokers, Princes-street (Oct. 31), write:—The most important movement in the market since last report was in Canadian Pacific shares, which a week ago stood at 53 $\frac{1}{2}$. The price at one time on Monday touched 67, on an intimation that the Canadian Government had guaranteed a dividend of 3 per cent. per annum on the shares, leaving the free earnings to supplement the 3 per cent. per annum. In most departments business has been very quiet. Since Wednesday last week Caledonian has declined from 103 $\frac{1}{2}$ to 103 $\frac{1}{4}$; Great North from 54 $\frac{1}{2}$ to 54 $\frac{1}{4}$; North British from 103 $\frac{1}{2}$ to 103 $\frac{1}{4}$; Edinburgh and Glasgow from 41 $\frac{1}{2}$ to 41; Grank Trunk from 20 $\frac{1}{2}$ to 19 $\frac{1}{2}$; and the Third Preference from 49 $\frac{1}{2}$ to 48 $\frac{1}{2}$. In mines Arizona Copper have receded from 42s. 6d. to 41s. 3d.; Clyde Coal from 65s. to 62s.; Rio Tinto from 20 $\frac{1}{2}$ to 20 $\frac{1}{4}$. In oil shares Broxburn have gone from 28 $\frac{1}{2}$ to 27 $\frac{1}{2}$; Burntisland from 23 $\frac{1}{2}$ to 21 $\frac{1}{2}$; Clippens from 18 $\frac{1}{2}$ to 17; Lanark from 41s. with 3d. paid, to 32s. 6d. with 5d. paid; Midlothian from 11 $\frac{1}{2}$ to 9 $\frac{1}{2}$; Uphall from 8 $\frac{1}{2}$ to 8 $\frac{1}{4}$; Youngs from 11 $\frac{1}{2}$ to 10 $\frac{1}{2}$. In banks, Bank of Scotland has changed from 303 to 305. Commercial from 55 $\frac{1}{2}$ to 55 $\frac{1}{4}$; Royal from 218 to 217; Union from 23 $\frac{1}{2}$ to 23 $\frac{1}{4}$. In insurance, North British and Mercantile have fallen from 25 $\frac{1}{2}$ to 25 $\frac{1}{4}$.

IRISH MINING AND MISCELLANEOUS COMPANIES SHARE MARKET.

CORK.—Messrs. J. H. CARROLL and SONS, stock and share brokers, South Mall (Oct. 31), write:—Markets remain dull. Great Southern changed hands at 119 $\frac{1}{2}$, and Midlands at 82 $\frac{1}{2}$. Bandons remain 85 $\frac{1}{2}$, and Macroom Pref. were done at 6 3-16. National Banks were 24 $\frac{1}{2}$, and Hibernians 26. Provincials remain 31 $\frac{1}{2}$, and Munsters were done at 6 $\frac{1}{2}$. Alliance Gas remain 18 $\frac{1}{2}$, and Cork Gas at 7 $\frac{1}{2}$. Dublin Trams are 8 5-16, and Cork Steam Packets 11 $\frac{1}{2}$. Steam Ships were done at 16 $\frac{1}{2}$, and Gouldings wanted at 9 $\frac{1}{2}$. No change in Levys, but Lyons (5 $\frac{1}{2}$ paid) shares were offered at 6 7-16, and Gresham Hotels changed hands at 3 $\frac{1}{2}$. Breweries still offered at 4 $\frac{1}{2}$.

FOREIGN MINING AND METALLURGY.

There is a little news to communicate with respect to the Belgian Coal Trade which continues to present much the same tone. In Germany the coal trade has also shown no change. Household coal is readily disposed of, but coal adapted for industrial and metallurgical purposes has been placed with some difficulty. The exports of German coal to Italy have not increased in importance; on the contrary, they have somewhat fallen off of late, having amounted in September to only 3560 tons, as compared with 4410 tons in August. The railways of the Ruhr continue to carry large quantities of coal; but there was a slight falling off in the first half of October, the daily average, movement in that period having been 77,770 tons, as compared with 79,270 tons during the second half of September. If we extend the comparison to the first half of October, 1882, however, we find a daily increase of 3540 tons. Coal prices have scarcely varied upon the German markets during the last few days. The Slesian Blast-Furnaces, Ironworks, and Collieries Company realised a profit of 18,365 $\frac{1}{2}$ in the financial year ending June 30, 1883. This sum enabled the council of administration to provide fully for all the fixed charges of the company, but no dividend will be paid for the year upon the shares. The Petit Try Colliery Company commenced the payment of a dividend of 14s. per share yesterday in respect of the financial year 1882-83. The John Cockerill Company commenced the payment yesterday of a dividend of 7 per cent for the financial year 1882-83.

There is an almost entire absence of news as regards the Belgian Iron Trade. The situation remains generally without change. The blast furnaces are well employed as regards refining pig; but to secure orders for casting pig reductions of no great amount would have to be made. The Belgian rolling-mills are not well off for orders, and the mechanical construction establishments have also no great amount of work on hand, although some of them are better off than others. English casting-pig has made 27. 5s. 8d. per ton; Charleroi casting-pig, 27. 6s. per ton; and pig from the Luxembourg, 27. 6s. 6d. to 27. 7s. 4d. per ton. Refining pig has been firm at Charleroi; hard pig has made 27. 4s. per ton; ordinary pig, 27. per ton; and mixed pig, 17. 16s. per ton. Athus-Halanzy pig has been quoted at 17. 19s. 2d. to 27. per ton. As regards iron, we may state that No. 1 has not sold below 57. per ton; but it can scarcely be said that No. 2 has not occasionally receded below its nominal quotation of 57. 8s. per ton; while No. 3 has been supported with difficulty at 57. 16s. per ton; No. 2 plates have made 67. 16s. per ton; No. 3 plates, 77. 12s. per ton; and plates of commerce, 97. 4s. per ton. The general aspect of the Austro-Hungarian iron trade has been favourable. Pig especially has been in good demand—so much so, that it is not improbable that imports of some importance will have to be made from Westphalia and England. The condition of the Austro-Hungarian steelworks is also satisfactory, in consequence of the large demand for rails from several important lines for renewal purposes. The probable production of steel rails in Austria in 1883 is roughly estimated at 173,000 tons, as compared with 116,850 tons in 1882, and 105,000 tons in 1881.

The aspect of the French Iron Trade has been rather firm, so far as the Nord is concerned. The Paris market, which has hitherto formed one of the principal outlets for the ironworks of the Nord, is now almost entirely supplied by forges established in the immediate neighbourhood of the capital. The Nord has, however, been enabled to procure other clients; and merchants' iron has been maintained with firmness in presence of important orders, which assure employment throughout the winter months. The great French railway companies are not giving out many orders, as they are awaiting a

vote of the Senate. Pig has been quoted at Longwy at a minimum of 27. 6s. 6d. per ton; a decline which has taken place in stocks assures a firm maintenance of this quotation. The Jeuf Steelworks produced in September 2400 tons of steel rails, while the Longwy works turned out 8600 tons. The state of the German iron trade is regarded as rather precarious. The demand for pig has not increased, but has returned to about the level at which it stood a month since. Bars have been somewhat neglected, and although the basis price has not nominally varied, it is certain that iron has been sold at 67. per ton, and in some cases even below that rate. Plates have been in better demand, and the steelworks have a sufficient number of orders on hand to assure them employment for some time to come. During the last few weeks the German Government has given out orders for no less than 100,000 tons of railway material. The Oberbilk Steelworks have secured an order for 1100 locomotive tyres, at 117. 15s. At Magdeburg the Bochum Works have taken 3550 tons of rails, at 67. 3s. 4d. per ton, while the Hoesch Works have secured an order for 1670 tons, at 77. 4s. per ton. At Cologne Messrs. Stamm Brothers have taken a contract for 5340 tons of rails, at 77. 2s. per ton.

MORE SMELTERS FOR ARIZONA.—The Copper Mountain Mining Company, at Stoddard, and the Copperopolis Company, on Castle Creek, have now in course of construction copper smelting plants of capacity of 80 tons each. The developments of both these companies are said to be of a most promising character. These plants were furnished by the Pacific Ironworks, of San Francisco, a firm that is famous all over the world for the superiority of their mining machinery. Their water jacket smelters have long been recognised as the best anywhere made, for both lead and copper ores, and give assurance of success to all companies who adopt them.

—Phoenix, Arizona, Gazette.

SAPPHIRES IN NEW SOUTH WALES.—The New South Wales sapphires, in common with those from other parts of Australia, are usually rather dark in colour; they, however, are found varying from perfectly colourless and transparent, through various shades of blue and green, to a dark and almost opaque blue. One or two green coloured sapphires or oriental emeralds are almost always met with in every parcel of a hundred or so specimens; also blue and white particoloured asteria or sapphires, which show a six-rayed star of reflected light, are by no means uncommon. Sapphires are almost invariably met with by the miners as an accompaniment of alluvial gold. They are widely distributed over the New England district, as at Bingera, county of Murchison, and near Inverell, Rose Valley, Swanbrook, Vegetable Creek, and Newstead, county Gough, with tin, adamantine spar, zircons, topaz, and bismuthite; in Cope's Creek, county Harding; Oban, county Clarke; Nundle Creek and Peel River, county Parry; Dundee, Ben Lomond, Mann's River, Gwydir River; in the county of Sandon, at Uralla; on the Naomi River; on the Abercrombie River; blue and green sapphires near Mount Werong, with pleonaste, zircons, gold, &c., county of Georgiana; on the Cudgong River, county Phillip; at Two-mile Flat, Bell's River, and Pink's Creek, county Roxburg, with white topaz, almandine garnets, epidote, spinelle, chrysoberyl, chrysolite, hyacinth, &c.; at Tumberumba, county Wynward, with tinstone and other minerals; in the Shoalhaven River, county St. Vincent; and the Snowy River, county Wallace. These places will readily be found on any modern map of the colony.

SCIENCE MONTHLY.—The first number of a magazine bearing this title has been issued for November by Mr. David Bogue, of St. Martin's-place, and to judge from the series of articles contained the periodical will have a favourable reception from scientific amateurs generally. Though sound and accurate the papers are thoroughly popular, and the subjects selected cover so wide a range that Science Monthly is likely to become a very general favourite. In addition to original articles by able writers there are summaries under special headings—the library (reviews), topics of the time, table talk, summary of news, the observatory, the laboratory, the museum, recreative mathematics, and so on—which are evidently to be continued from month to month, and which give just such an idea of what is going on in connection with science, as the lover of science whose occupation prevents him from devoting himself to the study of it would like to read. The magazine is well and amply illustrated, and in every respect worthy of support.

IMPORTANT MINERAL DISCOVERY NEAR KINMARE, CO. KERRY, IRELAND.—MOST EXTRAORDINARY REVELATIONS IN CONNECTION WITH THIS DISCOVERY.—Ah! Is it not this very mineral discovery that has led to the deplorable murders that were being committed in the Phoenix Park as well as others equally deplorable in Ireland. I ask is it not a crime to be silent where the lives and liberties of a people have been paralysed by ruthless hands for a political object. Will the Marquis of Hartington look this right in the face, and persist in an investigation as to those facts? If so, Ireland will get rid of her long sufferings, and Sir Stafford Northcote will then shut up her further sowing seeds of discord so uncharitably planted amongst all her Majesty's subjects. Wanted a partner or two? To enable the development of this great mineral treasure. As no letters can reach me having reference to those minerals, if you want to make wealth let me respectfully ask you to come and judge for self.—P. M. MOLONY, Peatfield, Kinmare, Kerry. [ADVT.]

HOLLOWAY'S PILLS—EPIDEMIC DISEASES.—The alarming increase of fevers and zymotic diseases, should be a warning to everyone to subdue at once any irregularity tending towards disease. Holloway's pills should now be in every household to rectify all impure states of the blood, to remedy weakness, and to overcome impaired general health. Nothing can be simpler than the instructions for taking this corrective medicine, nothing more efficient than its cleansing powers, nothing more harmless than its vegetable ingredients. Holloway's is the best physic during the autumnal season, when decaying fruits and unwholesome vegetables are frequently deranging the bowels, and daily exposing thousands through their negligence in permitting disordered action, to the dangers of diarrhoea, dysentery, and fever.

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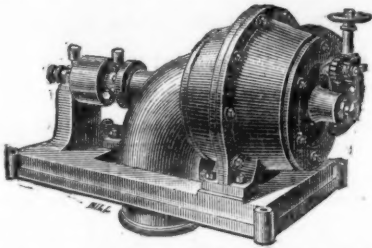
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COPPER WORKS LADLES,

To which special attention is given. Rabble Heads, Paddles, and every description of Light Hammered Work.

THE MANING TURBINE.

An improved turbine which appears to have given much satisfaction to the users has been brought out under the above cognomen by Mr. CHARLES L. HETT, of the Anchorlme Ironworks, Brigg, and as the economic raising of water is frequently of paramount importance in connection with the working of mines, the subjoined particulars of the Maning turbine is calculated to prove of great interest to the readers of the *Mining Journal*, and the small illustration of the wheel herewith gives a very fair idea of its construction. It will be seen that in designing this wheel Mr. Hett has studied every feature likely to render it portable, efficient, and accessible, the last-mentioned point being of great consideration. It is so constructed that the runner and shaft, as well as all the working parts, can be examined, and, if need be, withdrawn without disturbing the pipes or connections in any way. In wheels of small diameter the runner of the inward flow type is made of gunmetal, cast in one piece accurately turned and balanced; this is mounted on a steel spindle, which also carries the pulley. The wheel is adjusted and kept in position by gunmetal screws at each end in conjunction with lignum vitae glut, with water lubrication at regulating end, and steel convex washers at driving end of turbine. The draught tube is fitted with a cast-iron sleeve bearing, fitted with Stannah's patent stuffing-box, through which the spindle passes, the outer end being carried by improved bearing of Mr. Hett's design. The case is of cast-iron, which, to ensure perfect solidity of the castings, is made in two pieces, with turned and faced joints; this method prevents any imperfections in the castings being overlooked, as in machinery they are brought to light, sufficient substance being left to clean them out. The case is provided with an end cover, fitted with hand-wheel, regulation, which actuates direct on to the gates of the turbine. These are of the "fly lap" principle, which kind of gate has been found to give the best results in practice. A cast-iron curved draught tube for conveying the waste water away from the wheel is provided as shown. The whole is mounted on a cast-iron bed-plate, and is perfectly self-contained, thus ensuring perfect rigidity.



The wheel is specially suitable for export. It can be taken entirely to pieces, and when packed for shipment no piece is of greater weight than is consistent with strength and efficiency. Full instructions are given for fixing and erecting the turbines, and as every part is marked no difficulty is found in putting the wheel together, even by unskilled hands. The turbine possesses the advantage of being suitable to almost any position between the head and tail water, and can even be bolted to a wall if necessary. In the latter case the draught tube is varied to suit the position. By using this description of wheel all heavy intermediate gearing is dispensed with, as the power can be taken off the pulley on the turbine spindle and transmitted direct to the machinery to be driven. Wheels up to 16 in. diameter are made of the principle as shown, but for larger sizes a special arrangement is adopted, as illustrated in the large engraving. This represents a patent Maning wheel of 24 in. diameter, which was constructed for export to Mexico. The case in this instance is mounted on two wrought iron girders 24 ft. long by 14 in. deep, by 6 in. wide. The shaft is carried by improved adjustable bridge bearings, and to suit the requirements of the site for which it was adopted it projects through both ends of the case, admitting of the driving pulley being placed at either end. The buckets of the runner are of steel pressed into proper shape and cast into the wheel, which is carried by a steel shaft 3½ in. diameter. The driving pulley is 42 in. diameter by 23 in. wide. End adjustment is provided to compensate for wear and to retain the wheel in position. The supply inlet is 36 in. diameter, the waste water being carried away as in the previous case, by a curved draught tube, which dips into the tail water, thus utilising every inch of fall. This class of turbine is specially suitable to medium falls, and for driving, mining and milling machinery it is unsurpassed either in design or efficiency. We understand that Mr. Hett supplies these wheels in conjunction with air compressing machinery, for driving which they are peculiarly adaptable. For low falls the patent Trent wheel, with upright shaft, is recommended and universally used; but for very high falls Mr. Hett constructs a wheel of large diameter, with horizontal shaft, which, while retaining a maximum of efficiency runs at a moderate speed in comparison with wheels of the ordinary type, which would, under some circumstances attain a speed both dangerous and difficult to deal with.

It may be mentioned that complete particulars for the gauging of water-power and size of wheel, &c., is given in the catalogues of Mr. Hett, which have just been issued. He is, it appears, the only British maker of turbines of the type described, and there can be no question that a thorough knowledge of hydrostatics and a study of every wheel of American repute has enabled him to bring out one which combines all the advantages suggested by modern practice.

TREATING METALLIC ORES BY ELECTRICITY AND WATER COMBINED.

The invention of Mr. W. J. TANNER, of Kensington, relates to an improved method of treating metallic ores, with the object of effecting wholly or partially the required disintegration of the substances treated, by the combined action of electricity and water, and to apparatus employed for that purpose. In carrying out the invention he constructs a vessel or receptacle of any shape or size, and of any material, whether the same be a conductor of electricity or not. In the case of the vessel or receptacle being a conductor of electricity he makes such vessel answer the purpose of the negative pole (or cathode) by attaching the same to the negative pole of the battery, or other source of electricity; and in the case of the vessel not being a conductor of electricity, he places within the vessel, either at the bottom or sides thereof, or in any other convenient position suitable electric conductors according to the nature of the ore to be treated, such conductors being in the form of plates, bars, rods, or the like, and either stationary or moveable, and he connects them to the negative pole of the battery or other source of electricity. He places inside the vessel copper plates, bands, rods, wires (moveable or stationary), or other suitable electric conductors, and he connects such conductors with the positive pole of the battery or other source of electricity, thus making such copper rods, plates, bands, or wires the anode.

The anode must not directly touch or come into contact with the negative pole or cathode, but may be above, or at the side, or around the same. The vessel must be filled either wholly or partially with water, so that the electricity is carried from one pole to the other, through and by means of the water, so that the positive and negative poles of the battery, or other source of electricity, which had not been in circuit before shall be joined in circuit by the intervention of a stratum of water. In the water contained in the vessel he places the metallic ore, after the same has been ground or pulverised, allowing it to be moved by stirrers or not. The water may be allowed to remain in the vessel, or a stream of water may be kept flowing through it. By employing the electric current, as herein described, each individual unit or particle of the ground or pulverised ore is acted upon by the electricity contained in the water, and this tends to decompose or disintegrate the substances acted upon. By this treatment, the expensive and laborious processes now in use for the reduction of metallic ores into their component parts are greatly facilitated, thus rendering the final separation easy by the most simple processes in use.

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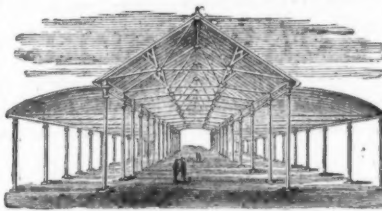
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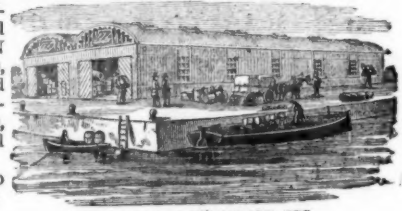
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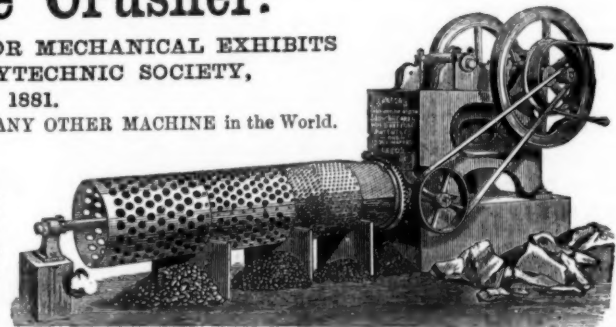
To Mr. Baxter, Leeds.

Cinderford, Feb. 13, 1883.

DEAR SIR,—I am pleased to be able to tell you that the Machine works splendidly. We are breaking 16 trucks a day now and we thought it a good day's work to do 10 a day with the old Machine, so you can see the difference. I had a gentleman looking at it yesterday, and he was surprised to see it work so easily.

Yours truly, E. ORGAN.

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MACADAM'S VARIABLE TURBINE.

This Wheel (which is now largely in use in England, Scotland, and Ireland) is the only one yet invented which gives proportionate power from both large and small quantities of water. It can be made for using a large winter supply, and yet work with equal efficiency through all variations of quantity down to a fifth, or even less if required. It is easily coupled to a steam-engine, and in this way always assists it by whatever amount of power the water is capable of giving, and therefore saves so much fuel.

This Turbine is applicable to all heights of fall. It works immersed in the tail-water, so that no part of the fall is lost, and the motion of the Wheel is not affected by floods or back-water.

References to places where it is at work will be given on application to—

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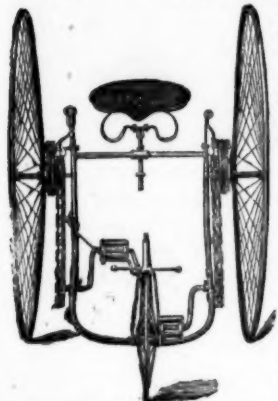
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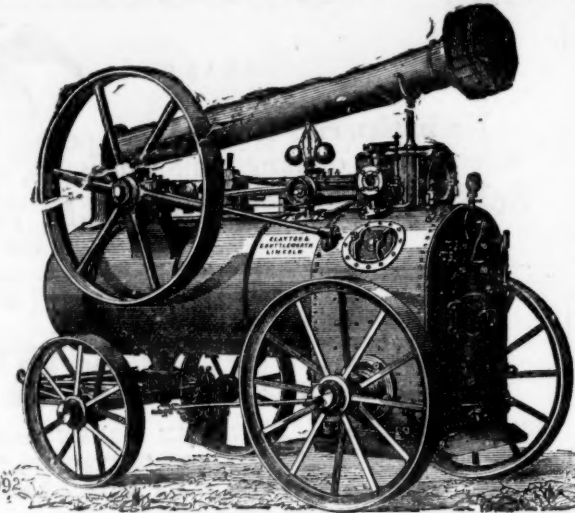
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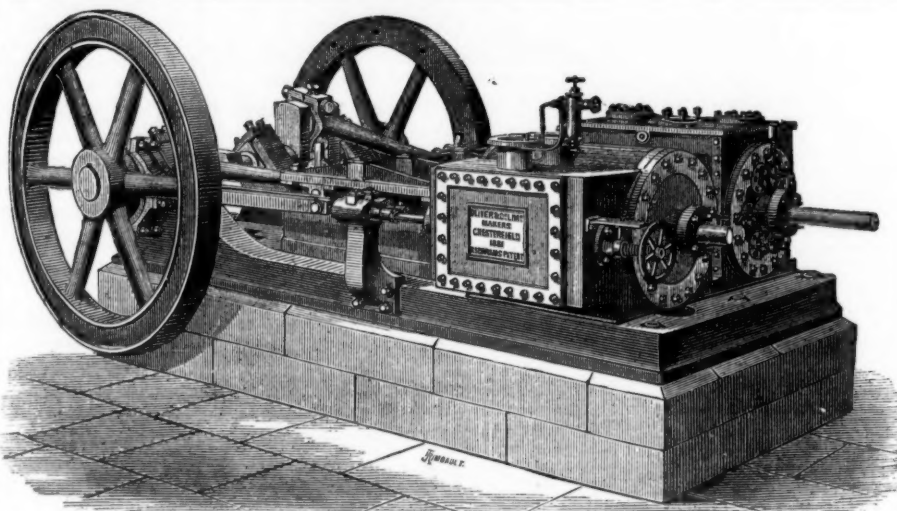
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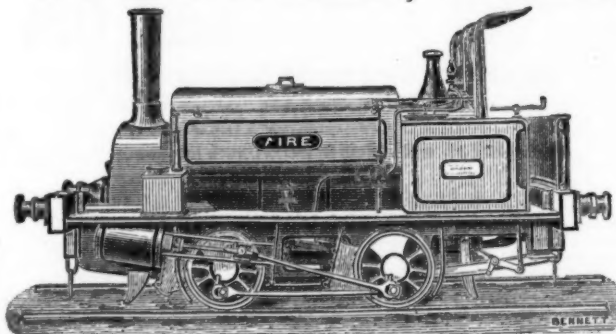
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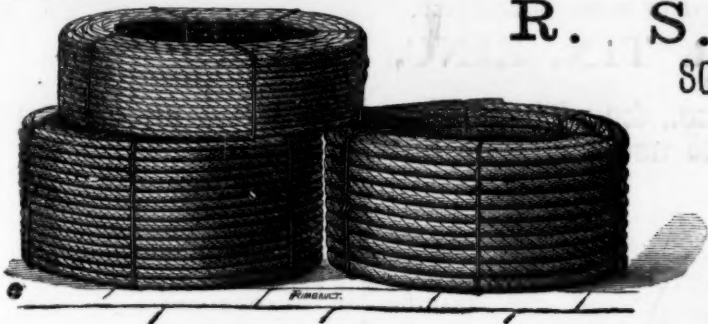
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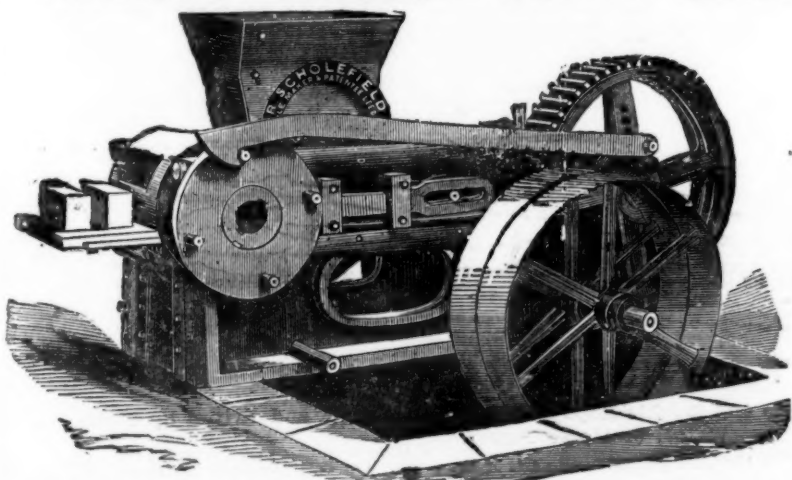
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Messrs. Yeadon and Co., Lee
I continue to be perfectly satisfied with the work performed by the two patent Briquette Machines as well as with that of the
Steam Engine, Mixer, &c., which you supplied a few months ago for the manufacture of compressed slack Briquettes, and that I can
recommend them as being the best machines I know of, after having carefully studied all the Briquette Machines con-
structed at home and abroad.
SOCIETE DES CHARBONNAGES REUNIS DU RIEU DU CŒUR ET DE LA BOULE. QUAREGNON (BELGIUM), SEPTEMBER 13TH, 1879
Messrs. Yeadon and Co., Leeds.
We are entirely satisfied with the erection and working of the two Briquette Machines, as well as the Steam Engine and Mixing
Apparatus.
Messrs. Yeadon and Co., Leeds.
I continue to be highly satisfied with the Briquette Machines which you supplied in 1877. They do their work very
well, and produce the Briquettes very regularly, and of a good quality.
Messrs. Yeadon and Co.
I have the honour to inform you that the Briquette Machines work very well. The Briquettes are very well made. I am
highly satisfied with your workmen, who have done their work very well.
The undersigned, Civil Engineer of Mines, Chevalier of the Legion of Honor, Consulting Engineer to the Mines de Vendin-lezto,
Bethune, Pas-de-Calais, certifies that the Briquette Machinery for making Briquettes of Coal, supplied by Messrs. Yeadon and Co. to
the above Company is working to their entire satisfaction.
Lille, December 28, 1880

R. SCHOLEFIELD'S LATEST PATENT BRICK-MAKING MACHINE.



R. S. begs to call the attention of
all Colliery Owners in particular to
his PATENT SEMI-DRY BRICK
MACHINE, and the economical meth-
od of making bricks by his patent
machinery from the refuse that is
taken from the pits during the pro-
cess of coal-getting, which instead
of storing at the pit's mouth (and
making acres of valuable land use-
less) is at once made into bricks
at a very small cost, by R. S.'s Pa-
tent Brick-making Machinery. If
the material is got from the pit hill,
the following is about the cost of

production, and the hands required to make 10,000 pressed bricks per day:—

2 men digging, each 4s. per day	8 0
1 man grinding, 4s. 6d. per day	4 0
1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day	2 0
1 boy greasing, 1s. 6d. per day	1 6
1 engine-man, 5s. per day	5 0
1 man wheeling bricks from machine to kiln, 4s. per day	4 0

Total cost of making 10,000 pressed bricks ... £1 6 0, or 2s. 3d. per 1000.

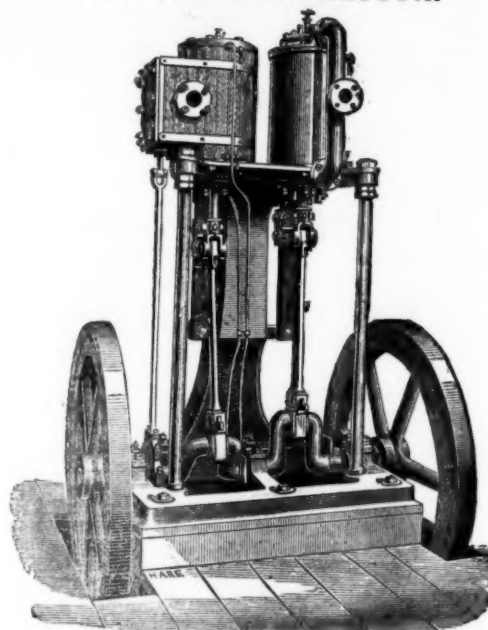
(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging.
As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the
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THE MACHINES CAN BE SEEN IN OPERATION AT THE WORKS OF THE SOLE MAKER AND PATENTEE DAILY.
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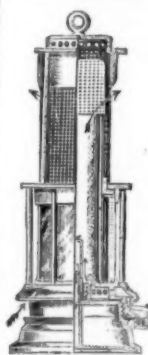
The work performed by this machinery, through some of
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In Cornwall, irrespective of the work done by the "Cham-
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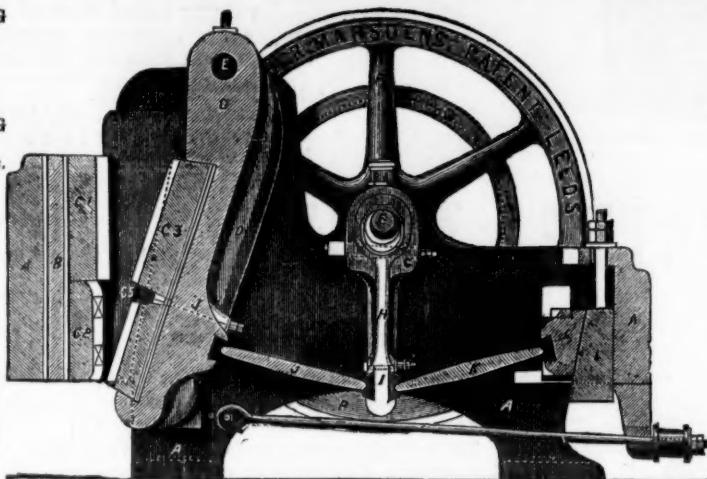
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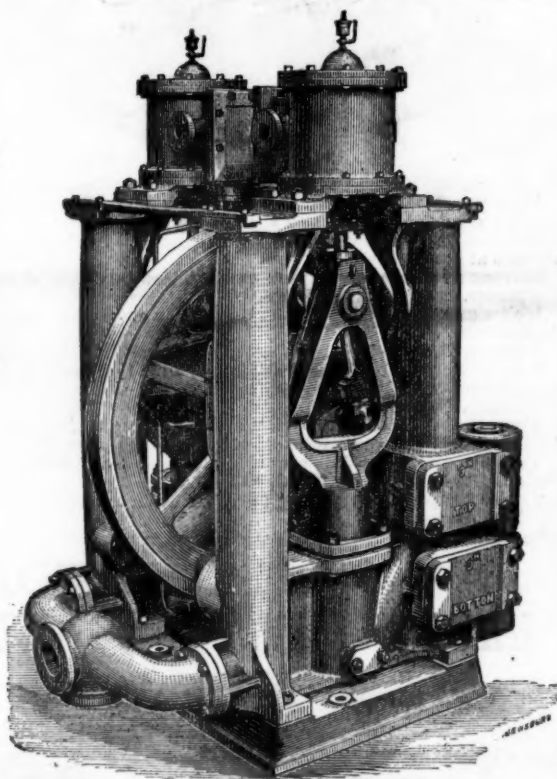
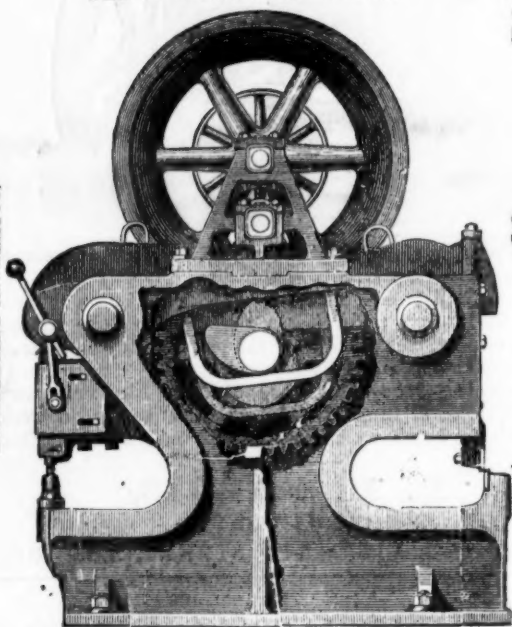
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